# SELECTIONS

FROM

# PUBLIC CORRESPONDENCE,

PUBLISHED

# BY AUTHORITY.

## NORTH WESTERN PROVINCES.

## PART I.

AGRA:

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# PREFACE.

The records of the Government frequently contain information of much importance, which it is desirable should be generally known. This information is of particular value to those, who are engaged in the Civil Administration of the country. The measures which have been attended with beneficial effects in one part of the country may often be introduced with advantage into another. Whilst the detection and prevention of abuses by one officer may often lead to their discovery and remedy by another. If all information of this nature, likely to be generally useful and interesting were freely circulated, public officers would be enabled, more readily than at present, to compare the state and resources of different parts of the country, and to trace the effect of measures, which they have actually carried out or have in contemplation.

The conviction of this truth has led of late years to the printing and publication of many public documents, such as Settlement Reports, papers on irrigation, narratives of celebrated Thug and Decoit leaders &c. These however form detached pamphlets, which are not easily kept together, nor always accessible for reference. Besides which nothing is printed, but what from its length and importance is evidently deserving of separate preservation, whereas often the brief notices of passing events or casual returns, which occur in the midst of other less important matter, are nevertheless of much moment and are calculated to gratify laudable curiosity or to stimulate to further enquiry.

In order then to bring together whatever is likely to be practically and generally useful in promoting the good Government of the country and the more complete developement of its capabilities and recources, it has been detemined to print in a uniform size and consecutive entire papers or parts of papers, which may appear worthy of preservation. Successive numbers will be published as matter may accrue, and and they will be circulated gratuitously to all public officers.

The following number is the first of the series. Six such will constitute a volume and to each volume there will be a copious Index.

# SELECTIONS

FROM THE

# RECORDS OF GOVERNMENT.

## No. I.

### REVISION OF THE CHOKEEDAREE ASSESSMENT, IN THE CITY OF BAREILLY.

No. 79 OF 1844.

FROM W. J. CONOLLY, ESQUIRE,

*Commissioner of Rohilcund.*

TO J. THORNTON, ESQUIRE,

*Secretary to Govt. N. W. P.*

JUDICIAL DEPARTMENT.

AGRA.

SIR,

At the request of Mr. R. H. Clarke, Magistrate of Bareilly, I have the honor to submit the accompanying report I have received from him (No. 38 dated 5th July last) relative to a revision of the Chokeedaree assessment in that town.

2. By Regulation XXII. of 1816 (Sections 9 to 11) a Punchayet, consisting of five individuals, should be appointed for each mohullah, or other convenient division of the town, by whom the assessment is to be made subject to the revision of the Magistrate.

The number of Punchayets has now been reduced from twenty-eight to ten, corresponding with the Police *gushts* into which the city is divided, and between these Punchayets and the Magistrate, a Sudder Punchayet has been appointed whose duty it is to revise and control the acts of the lower Punchayets before they are submitted to the final control of the Magistrate. It was in fact through the Sudder Punchayet, (who were individuals especially selected for their influence and respectability), that the revision of the old assessment was made. The old twenty-eight Punchayets submitted their statements to them, and they were then revised and corrected, with reference to new statements and a census that had been prepared by the Bukhshee, in the manner pointed out in Mr. Clarke's report. The only defect that struck me in this plan was, that it in a great measure superseded the functions of the Magistrate, putting the Sudder Punchayet in his place; for it appeared that, in fact, all appeals against the assessment were referred to them. Some dissatisfaction was in the first instance expressed against the new assessment. The bunyas in one quarter of the city shut up their shops, and several persons of character protested to me against it; and as a Chokeedaree assessment is rather a delicate matter to deal with at Bareilly, I thought it most prudent to decline passing any opinion on the measure, till I was assured full publicity had been given to it in the mode prescribed by the Regulation, till all appeals had been fairly taken up and disposed of by the Magistrate, and till it had been subjected to a short trial. All this has now been done. The revised assessment has been in force for some months, is said to be easily collected, and there are no longer any complaints. Mr. Clarke's successor, Mr. Williams, expresses himself perfectly satisfied with what he has seen and heard of it, and there seems no reason why it should not be confirmed. The part of it to which the sanction of Government is especially required, is the raising of a certain portion of the Chokeedars' salaries to four Rupees under Regulation VII. of 1817, (Section 2). The pay of these men is adjusted on a graduated scale, varying from four to three Rupees, which is the most likely way to encourage good behaviour. Mr. Clarke expresses a hope that some acknowledgment may be made to the Sudder Punchayet for their good services on this occasion. I conceive that both the Punchayet and Mr. Clarke himself, are entitled to the thanks of Government, for the successful way in which the revised assessment of so difficult a city to deal with as Bareilly, has been introduced, and carried through.

I have &c.

(Signed) W. J. CONOLLY,
*Commissioner.*

*Commissioner's Office, Rohilcund Division,*
*Bareilly, the 3rd October* 1844.

No. 38 of 1844.

From R. H. P. CLARKE, Esquire,

*Magistrate of Bareilly,*

To W. J. CONOLLY, Esquire,

*Commissioner of Rohilcund.*

*Bareilly, dated the 5th July* 1844.

Sir,

With reference to the 35th paragraph of my Police Report, I have now the honor to submit a report on the Chokeedarree assessment of the town of Bareilly.

2. In the Appendix will be found two statements, one shewing the assessment with receipts and disbursements from 1817 to 1843: the other, the new arrangements proposed, in a tabular form.

3. It has generally been remarked, that in the growth and progress of society, the application of principles and the adoption of means to certain ends, require periodical revision to keep them efficient or adequate for their intended purpose; and in no department of the Police, has experience more clearly pointed out the necessity of improvement, than in that of the Chokedarree arrangements in force in the town of Bareilly.

4. Before entering into the reasons that have induced me to propose a new organization of the system, it may be useful to take a brief review of the past history of the Chokeedarree tax.

5. It was prescribed by Regulation XXII. of 1816. Before the promulgation of that enactment, a voluntary contribution was raised by the people for maintaining a constabulary force, and the new tax being from the first openly objected to, its enforcement afterwards caused the insurrection of that year, ending in a religious quarrel and a battle, in which the insurgents were put down after a severe chastisement.

6. The scheme provided by the law, however, was carried out, and the system introduced in all its details. One Chokeedar was appointed to every 25 or 30 houses, and an allowance of two or three rupees fixed as his salary. Punchayets were appointed to regulate the impost, to prepare the register of houses, and for the other duties attached to their office.

7. The Chokeedarree police system being viewed by the people as an innovation, was opposed with as much energy as they could venture to offer. Their temporary success too, had this bad

effect, that the details of the scheme were carried out with a lax hand, and a spirit apparently indifferent to the objects contemplated by the legislature. In short the working of the system was left entirely to the mohulla Punchayets.

8. An experience of 28 years has shewn how inefficient these arrangements were. From the facilities afforded for corruption, the system of registration was defective; the rate of tax was graduated, not on any principle, but according to the whim and caprice, partiality or dislike, of the assessors. The people have consequently always been, and justly too, loud in their complaints of undue exaction and dishonesty in the distribution of the tax, although the aggregate amount was notoriously much below the sum leviable with reference to the resources of the town.

9. Such was the rotten state of the Punchayets. That of the chokeedars was equally bad; they were subjected to no proper restraint; many of them were connivers at crime, or the perpetrators of it; they extorted all they could from the lower classes, even above the amount of tax leviable from them, as also from bad characters, courtezans, gamblers &c; and frequently embezzled a portion of what they collected:—so that a chokeedar's situation was considered to be worth a sum calculated, with reference, not so much to the salary to be received, or duty to be performed, but to the corrupt gains obtainable, of the nature above described.

10. Looking to the intentions of the legislature, I may safely assert that they have been in a great measure frustrated. As the correction of these abuses therefore, and the adequate provision of security of the public peace, appeared to be an important duty, measures were adopted last year, and continued during the present year, for a thorough investigation into the existing system; and for making a new assessment determinable according to the condition in life of the inhabitants.

11. These proceedings very naturally excited opposition among all who had profited by the former corrupt state of things. They were by no means willing that their mal-practices should be dragged into daylight, or that the advantages that they had so long enjoyed should be curtailed. The old Punchayets, chokeedars, and those whose houses were not registered, or were under-assessed, were bound by a community of interests in offering every objection in their power to the change that was in contemplation, and instigating others to unite with them in their designs.

12. A meeting at last was convened of the heads of the different classes, the objects of the proposed new arrangements

were fully explained, and an arrangement made for the formation of a new Committee, composed of five persons; namely Mr. MacCutchan, as president, two Mahomedans and two Hindoos,* to carry out the details of the proposed revision.

* 1 Nawab Suadutyar Khan,
2 Nawab Khan Buhadoor Khan,
3 Bhuwanee Doss.†
4 Girdharee Loll.
† Esreepershaud, was appointed in the room of Bhuwanee Doss, after his decease.

13. The Committee met at the school-house and opened their proceedings in the most public manner, explaining to the people that the sole end in view was to correct abuses, to exempt the indigent from unjust assessment, and to bring all the affluent, who had hitherto succeeded in evading the payment of the tax and those who were inadequately assessed, under an equitable contribution. In fact, that capricious and undue imposts should be done away with, and every one be made to pay according to what he could afford; that the chokeedars be brought under proper discipline, and made more efficient for the protection of life and property; and that the surplus should be devoted to local improvement and the salubrity of the town.

14. These meetings were held for a long period three times a week, during which a completely new registration of houses was effected, and the Committee have closed their praiseworthy labors in the most satisfactory manner. Lists of the assessment have been circulated to heads of mohullas. The registers have been bound up, and four copies of each made in a clear legible hand to prevent the possibility of future alteration or mutilation. One is deposited with the local Punchayet; a second with the Bukhshee; a third in the Magistrate's Cutcherry; and a fourth is prepared for transmission to your office.

15. The town is divided into 10 gushts or sections comprising 17 Police chokees (besides the cotwalee) and 175 mohullas.

16. The number of houses taxed is 10,612 and the number exempted from the tax is 4,905.

17. There are 253 chokeedars on the establishment, or at an average of about 1 for every 60 houses.

18. The increase of the tax on the old arrangements amounts to Rs. 147-15-0; and on houses newly discovered, exempted through the dishonesty of the former Punchayets and excluded from the register, Rs. 126-9-0; making a total increase of Rs. 274-8-0.

19. Every information, regarding the means of the parties taxed, that was available having been carefully collected and considered, the payers were classified according to their trades, callings or professions.

20. The rate of the impost was then graduated agreeably to a fixed principle as shewn below.

| | |
|---|---|
| Malguzars to pay at the rate of ½ per cent on a juma of 500 Rupees; exceeding that sum, | one anna per cent. |
| Persons receiving monthly salaries, each, | one rupee ditto. |
| Dealers in sugar, Europe goods, Bankers &c. on each house, from— | one to two rupees. |
| Punsaries, dealers in Brass, Iron-ware, each house, from— | 4 to 8 annas per cent. |
| Dealers in Cloth, Shoes, Jaulwalas, Lohars, Carpenters &c. &c. each house, from— | 2 to 6 annas ditto. |
| Workmen, | one anna ditto. |

N. B. The tax in no instance exceeds two Rupees on each house.

21. These *general rates* were applied on assessing the houses of parties in the register, but in doing so, objections were invited, and after a careful collation of what each individual had to state with written and vivâ voce information, as to the objector's means of livelihood, the amount to be paid was fixed and communicated in a public manner to the party concerned.

22. It is possible, that still some errors may be found which will require revision, but the confidence of the people has been fully secured in the impartiality and justice of the new assessment; in corroboration of which it may be noticed that, although the assessment has been raised one-third above the amount of actual collections under the former system, and about 25 per cent in excess of the nominal impost, the paucity of petitions, and concurrent testimony of all those with whom I have communicated, go to prove, that the present tax is felt to press much lighter than the old one, from the equity and consideration with which it has been adjusted to the means of individuals.

23. The former administration of the assessment seems to have been faulty in many respects. The old Punchayets were composed of five members for every two or three mohullas, but the difference that existed in the respectability and rank of the members frequently prevented their meeting for the disposal of business;

or the members of the Punchayet, though men of rank, were above the duties required of them, or were wholly indifferent to the well-working of the system.

24. They usually gave in false registers of the houses within their respective circles of jurisdiction, and fixed on an arbitrary sum as the impost on each house, without regard to the means of the owner. No notice was served to the people of their decisions, and it often happened that until the Bukhshee sent in his demand after a lapse of some months, that the parties taxed were not acquainted with what they had to pay, while the payment was exacted without any explanation being required or received by the Punchayets, who rarely met to discuss each other's proposed demands. No public meetings were held so as to allow of their proceedings being watched and controlled by the voice of the public. Nothing in short could be more unpopular or more dishonest than the method pursued of levying and collecting the tax.

25. The extent of the evil above demonstrated may partly be seen from the fact of 1732 newly discovered houses having been brought by the recent arrangements under assessment, though great leniency has been shewn in exempting the lower orders from the tax, as is shewn by the circumstance of 2713 newly registered houses being excluded from its operation.

26. Another crying abuse which followed the mode of transacting business on the part of the Punchayet, was that of sending in a demand of arrears by the Bukhshee against parties, notwithstanding their having already paid up the amount due from them; that is to say, where a person had been in the habit of paying two annas or more for several months, he was called on to pay, for the same period, the arrears on the increase that he was told the Punchayet, on revising the register, had decided he should pay.

27. The result of this was that the collections never equalled the demand entered in the register filed by the Punchayet, and that the officers of the establishment were constantly brought into irritating collision with the people.

28. To remedy these abuses, the bringing of public opinion to bear on the proceedings of the administration by publicity, and the establishment of a closer connexion between the Magistrate and Punchayets, appear to be measures of the first importance.

29. The manner in which the first of these objects was attained has been above described. The other it is hoped will be secured by a reduction in the number of the Punchayets from 28 to 10, or one for each gusht, and with 3 instead of 5 members in each, chosen with especial care to their fitness for the office, and respectability of character. This is felt to be an essential condition

of improving the executive management; for the number of committees was far too cumbrous to admit of effective superintendence, and relieved each member of individual responsibility, while they were too intimately connected with local interests to hold out a hope of their ever becoming an efficient and trustworthy body of administrators.

30. But a more influential, intelligent and independent Punchayet seems absolutely necessary for the controul of the local Punchayets, by checking their incessant tendency to show partialities and dislikes, and for revising the registration of houses.

31. The advantages of a Sudder Punchayet would consist in their freedom from personal and local influences; their better ability to judge of the general working of the assessment by having the whole of its operations brought at once under review; and the superior means they would possess of testing the accuracy of the returns and statements made by the local Punchayets. I do not mean that this committee should hold any distinct power from the Magistrate, but act with him, and in all respects in subordination to his authority.

32. I would again suggest that the local Punchayets should be obliged to meet once a month and to furnish a quarterly report of their proceedings to the Magistrate, and that the Sudder Punchayet should hold their sittings twice a year for examining these returns and assisting the Magistrate generally in the revision of the assessment, and in all other matters connected with the constabulary establishment on which he might feel it expedient to consult them.

33. Three members, namely, the president and two ordinary members of the Sudder Punchayet, might be appointed by the Magistrate, and two by the people; the sense of the majority being collected by the votes of the local Punchayets. They might be armed with power to make diligent enquiries into all changes that had occurred during the six months previous to their sitting, to hear complaints, to test the census of houses where necessary, to suggest public improvements connected with the conservancy of the town and to furnish a six-monthly report to the Magistrate.

34. The remaining subject to which I would beg the favor of attention is the non-provision of any intermediate officer between the Bukhshee and chokeedars. It is impossible to avoid coming to the conclusion that a graduation of rank is necessary to render the establishment efficient and to prevent the chokeedars from pilfering those for whose protection they are paid and maintained.

35. I would propose therefore to appoint three inspectors of chokeedars on 10 Rupees each, as exhibited in the annexed

statement, who should be required to make a complete round once by day and once by night of every Chokee, and chokeedar's beat, within their respective jurisdictions, and one jemadar to every gusht at 6 Rupees per month for enforcing vigilance on the part of the chokeedars, and for reporting any neglect or misconduct. I would also recommend three grades of chokeedars, namely, the salary of about one-fourth to be raised to 4 Rupees a month; of a like number to 3 Rupees 8 Annas; leaving half on the old allowance of 3 Rupees per mensem.

36. The promotion from a lower to a higher grade would act as a powerful stimulus to good conduct and zeal on the part of the chokeedars, and tend to check that spirit of extortion and peculation which is known to be prevalent among them.

37. A detail of the present and proposed establishment is given below.

PRESENT ESTABLISHMENT.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Bukshee, ... ... ... ... | 30 | 0 | 0 | | | |
| 2 | Mohurrirs @ 7 each, ... ... | 14 | 0 | 0 | | | |
| 1 | Mududgar, ... ... ... ... | 6 | 0 | 0 | | | |
| | Sayer Khurch, ... ... ... | 3 | 0 | 0 | 53 | 0 | 0 |
| 251 | Chokeedars @ 3 each, ... ... | 753 | 0 | 0 | | | |
| 10 | acting as Jemadars @ 3 each, ... | 30 | 0 | 0 | 783 | 0 | 0 |
| | Total, ... | | | | 836 | 0 | 0 |

PROPOSED ESTABLISHMENT.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Bukshee, ... ... ... ... | 30 | 0 | 0 | | | |
| 2 | Mohurrirs @ 7 each, ... ... | 14 | 0 | 0 | | | |
| 1 | Mudadgar, ... ... ... ... | 6 | 0 | 0 | | | |
| | Rent of kuchehree, ... ... ... | 4 | 0 | 0 | | | |
| | Sayer Khurch, ... ... ... | 3 | 0 | 0 | 56 | 0 | 0 |
| 3 | Inspectors @ 10 each, ... ... | 30 | 0 | 0 | | | |
| 10 | Jemadars @ 6 each, ... ... | 60 | 0 | 0 | | | |
| 60 | Chokeedars @ 4 each, ... ... | 240 | 0 | 0 | | | |
| 60 | Ditto @ 3 ,, 8 ,, 0 each, ... ... | 210 | 0 | 0 | | | |
| 131 | Ditto @ 3 each, ... ... ... | 393 | 0 | 0 | | | |
| 2 | Chupprassies to attend the Bukshee @ 3 each, | 6 | 0 | 0 | 939 | 0 | 0 |
| | Total, ... | | | | 995 | 0 | 0 |
| | Increase, ... | | | | 159 | 0 | 0 |

which will still leave upwards of 200 Rupees per month available for the purposes of conservancy and meeting contingencies.

38. The Superintendence of the details of the Chokeedaree proceedings is entrusted to my Assistant, Mr. Inglis, to whom I am indebted for some useful information on the subject under report and for the discovery of some mal-practices in regard to the collections and mode of payment of the chokeedars.

39. The results of the Committee's labor bear ample testimony to their judgment, patient attention, and disinterested zeal; and will I trust obtain for them a separate acknowledgment of your approbation of their services.

40. Soliciting the favor of your obtaining the sanction of Government to the propositions now submitted,

I have the honor to be &c.

(Signed) H. CLARKE,
*Magistrate.*

*Bareilly Magistrate's Office,*
*The 5th July* 1844.

P. S. A specimen of the new Register is submitted for inspection.

# APPENDIX A.

*Annual statement of sums realized and disbursed on account of the Chokeedaree tax from* 1817 *to* 1843.

| Year. | Amount realized annually. | Disbursements. | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Account Establishment. | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Bukhshee. | | | Mohurrirs. | | | | Chokeedars. | | | | Total. | | | Contingencies. | | | Miscellaneous expenditure in the conservancy department. | | | Total disbursements. | | | |
| | | No. | Salary. | | | No. | Salaries. | | | No. | Salaries. | | | | | | | | | | | | | | | |
| 1817-18 | 12916 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 267 | 12790 | 7 | 6 | 12790 | 7 | 6 | 0 | 0 | 0 | 41 | 1 | 6 | 12831 | 9 | 0 |
| 1819 | 9829 | 9 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 262 | 9411 | 13 | 0 | 9411 | 13 | 0 | 0 | 0 | 0 | 27 | 0 | 0 | 9438 | 13 | 0 |
| 1820 | 9378 | 5 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 262 | 9357 | 4 | 0 | 9357 | 4 | 0 | 0 | 0 | 0 | 32 | 10 | 0 | 9389 | 14 | 0 |
| 1821 | 9442 | 2 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 9180 | 7 | 0 | 9180 | 7 | 0 | 0 | 0 | 0 | 15 | 4 | 6 | 9195 | 11 | 6 |
| 1822 | 9329 | 1 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 258 | 9264 | 8 | 0 | 9264 | 8 | 0 | 0 | 0 | 0 | 28 | 0 | 0 | 9292 | 8 | 0 |
| 1823 | 9366 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 259 | 9315 | 0 | 0 | 9315 | 0 | 0 | 0 | 0 | 0 | 5 | 6 | 0 | 9320 | 6 | 0 |
| 1824 | 9659 | 4 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 262 | 9423 | 0 | 0 | 9423 | 0 | 0 | 0 | 0 | 0 | 26 | 12 | 6 | 9449 | 12 | 6 |
| 1825 | 9817 | 9 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 267 | 9504 | 0 | 0 | 9504 | 0 | 0 | 0 | 0 | 0 | 27 | 9 | 6 | 9531 | 9 | 6 |
| 1826 | 9736 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 267 | 9504 | 0 | 0 | 9504 | 0 | 0 | 0 | 0 | 0 | 28 | 13 | 6 | 9532 | 13 | 6 |
| 1827 | 9658 | 12 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 267 | 9504 | 0 | 0 | 9504 | 0 | 0 | 0 | 0 | 0 | 27 | 0 | 0 | 9531 | 0 | 0 |
| 1828 | 9586 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 267 | 9504 | 0 | 0 | 9504 | 0 | 0 | 0 | 0 | 0 | 27 | 0 | 0 | 9531 | 0 | 0 |
| 1829 | 9545 | 14 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 267 | 9504 | 0 | 0 | 9504 | 0 | 0 | 0 | 0 | 0 | 27 | 0 | 0 | 9531 | 0 | 0 |
| 1830 | 9640 | 10 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 264 | 9474 | 0 | 0 | 9474 | 0 | 0 | 0 | 0 | 0 | 27 | 0 | 0 | 9501 | 0 | 0 |
| 1831 | 9640 | 13 | 9 | 1 | 210 | 0 | 0 | 2 | 98 | 0 | 0 | 254 | 9139 | 0 | 0 | 9447 | 0 | 0 | 21 | 0 | 0 | 21 | 6 | 0 | 9489 | 6 | 0 |
| 1832 | 9316 | 12 | 0 | 1 | 360 | 0 | 0 | 2 | 168 | 0 | 0 | 241 | 8681 | 0 | 0 | 9209 | 0 | 0 | 36 | 0 | 0 | 16 | 12 | 0 | 9261 | 12 | 0 |
| 1833 | 8767 | 0 | 0 | 1 | 360 | 0 | 0 | 2 | 168 | 0 | 0 | 228 | 8203 | 0 | 0 | 8731 | 0 | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 8767 | 0 | 0 |
| 1834 | 8826 | 0 | 0 | 1 | 360 | 0 | 0 | 2 | 168 | 0 | 0 | 230 | 8262 | 0 | 0 | 8790 | 0 | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 8826 | 0 | 0 |
| 1835 | 9997 | 2 | 0 | 9½ months | 285 | 0 | 0 | 2 | 168 | 0 | 0 | 266 | 9558 | 0 | 0 | 10011 | 0 | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 10047 | 0 | 0 |
| 1836 | 9886 | 11 | 9 | 1 | 359 | 0 | 0 | 2 | 168 | 0 | 0 | 267 | 9300 | 0 | 0 | 9828 | 0 | 0 | 36 | 0 | 0 | 78 | 2 | 0 | 9942 | 2 | 0 |
| 1837 | 9830 | 14 | 0 | 1 | 360 | 0 | 0 | 2 | 168 | 0 | 0 | 255 | 9144 | 0 | 0 | 9672 | 0 | 0 | 36 | 0 | 0 | 1 | 7 | 0 | 9709 | 7 | 0 |
| 1838 | 9763 | 13 | 3 | 1 | 358 | 0 | 0 | 2<br>1 | 168<br>54 | 0 | 0 | 254 | 9066 | 0 | 0 | 9646 | 0 | 0 | 36 | 0 | 0 | 42 | 1 | 6 | 9724 | 1 | 6 |
| 1839 | 10331 | 8 | 9 | 1 | 360 | 0 | 0 | 3 | 240 | 0 | 0 | 250 | 8976 | 0 | 0 | 9576 | 0 | 0 | 36 | 0 | 0 | 1161 | 15 | 9 | 10773 | 15 | 9 |
| 1840 | 10116 | 13 | 6 | 1 | 360 | 0 | 0 | 3 | 240 | 0 | 0 | 251 | 9012 | 0 | 0 | 9612 | 0 | 0 | 36 | 0 | 0 | 46 | 7 | 9 | 9694 | 7 | 9 |
| 1841 | 10058 | 3 | 6 | 1 | 360 | 0 | 0 | 3 | 240 | 0 | 0 | 251 | 9060 | 0 | 0 | 9660 | 0 | 0 | 36 | 0 | 0 | 118 | 12 | 11 | 9814 | 12 | 11 |
| 1842 | 10071 | 0 | 0 | 1 | 360 | 0 | 0 | 3 | 240 | 0 | 0 | 253 | 9099 | 0 | 0 | 9699 | 0 | 0 | 36 | 0 | 0 | 308 | 13 | 0 | 10043 | 13 | 0 |
| 1843 | 10120 | 8 | 9 | 1 | 360 | 0 | 0 | 3 | 240 | 0 | 0 | 254 | 9266 | 14 | 6 | 9866 | 14 | 6 | 36 | 0 | 0 | 551 | 4 | 6 | 10454 | 3 | 0 |

NOTE.—The salaries of a Bukhshee and 2 Mohurrirs from 1817-18 to 1830 were paid by Government.

BAREILLY,
*Magistrate's Office,*
*The 5th July* 1844.

E. E.

(Signed) HENLEY CLARKE,
*Magistrate.*

# APPENDIX B.

*Statement shewing the revised amount of Chokeedarree tax proposed to be levied under the provisions of Regulation XXII. of* 1816, *and Act XV. of* 1837,

*with the number of Houses, Gushts, &c., in the town of Bareilly and proposed establishment.*

| Alphabetical designation of Gushts or rounds. | 2 Number and Houses of Police Chokeedars in each Gusht. | 3 No. of Jemadars. | 4 No. of Inspectors. | 5 No. of Chokeedars. | 6 Total number of Houses. | 7 No. of Houses proposed to be taxed. No. of Houses taxed. | 8 No. of do. newly discovered. | 9 Total. | 10 No. of Houses exempted from the tax. No. of Houses exempted from payment. | 11 Do. do. now proposed. | 12 Total. | 13 Amount of tax levied under the old system. Rs. | As. | P. | 14 Amount of tax now proposed. Rs. | As. | P. | 15 Increase. On Houses inadequately taxed. Rs. | As. | P. | 16 On Houses newly discovered. Rs. | As. | P. | 17 Total. Rs. | As. | P. | 18 Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | 1 Bokharpooreh, ... 2 Enayutgunj, ... | 1 Jemadar, | ... | 24 | 1843 | 927 | 296 | 1223 | 69 | 591 | 620 | 81 | 2 | 0 | 116 | 13 | 0 | 14 | 6 | 6 | 21 | 4 | 6 | 35 | 11 | 0 | An enquiry has been instituted into the outstanding balances and arrangts. made for bringing them to an immediate adjustment. |
| B | 1 Muth, ... 2 Zoolficargunj, ... | 1 ditto | 1 Inspector | 32 | 1679 | 1112 | 200 | 1312 | 158 | 209 | 367 | 127 | 12 | 6 | 174 | 15 | 0 | 31 | 2 | 0 | 16 | 0 | 6 | 47 | 2 | 6 | |
| C | 1 Besahumpoor, ... 2 Musjid, ... | 1 ditto | ... | 20 | 1359 | 659 | 175 | 834 | 237 | 298 | 535 | 70 | 9 | 9 | 101 | 12 | 6 | 20 | 3 | 3 | 11 | 0 | 6 | 31 | 3 | 9 | |
| D | 1 Killah, ... 2 Kela Baugh, ... 3 Bazuergunj, ... | 1 ditto | ... | 26 | 1421 | 939 | 115 | 1054 | 228 | 169 | 397 | 94 | 1 | 9 | 108 | 4 | 6 | 8 | 10 | 9 | 5 | 8 | 0 | 14 | 2 | 9 | |
| E | 1 Malooapoor, ... | 1 ditto | 1 ditto | 21 | 1363 | 855 | 59 | 914 | 329 | 112 | 449 | 72 | 12 | 6 | 77 | 14 | 3 | 1 | 15 | 9 | 3 | 2 | 0 | 5 | 1 | 9 | |
| F | 1 Beebareepoor, ... | 1 ditto | ... | 20 | 1339 | 732 | 146 | 878 | 199 | 262 | 461 | 79 | 1 | 9 | 102 | 15 | 6 | 13 | 12 | 9 | 10 | 1 | 0 | 23 | 13 | 9 | |
| G | 1 Goojur Reitee, ... 2 Neikpoor, ... 3 Khajoor, ... | 1 ditto | ... | 30 | 1783 | 1128 | 181 | 1309 | 177 | 297 | 474 | 112 | 8 | 6 | 133 | 1 | 0 | 5 | 7 | 6 | 14 | 1 | 0 | 19 | 8 | 6 | |
| H | 1 Peer Buhoral, ... 2 Gurhee, ... 3 Bankhana, ... | 1 ditto | ... | 29 | 2024 | 1023 | 293 | 1316 | 371 | 337 | 708 | 93 | 12 | 0 | 146 | 1 | 6 | 30 | 12 | 0 | 21 | 9 | 6 | 52 | 5 | 6 | |
| I | 1 Sudder or Khas Cotwalee, | 1 ditto | 1 ditto | 26 | 1427 | 671 | 148 | 819 | 275 | 333 | 608 | 103 | 12 | 3 | 119 | 5 | 9 | 3 | 3 | 0 | 12 | 6 | 6 | 15 | 9 | 6 | |
| J | 1 Sudder 2nd ... | 1 ditto | ... | 21 | 1131 | 771 | 100 | 871 | 136 | 124 | 260 | 104 | 9 | 6 | 131 | 5 | 0 | 16 | 8 | 6 | 10 | 3 | 0 | 26 | 11 | 6 | |
| | 1 Chaonee Usruff Khan, ... | ... | ... | 2 | 118 | 63 | 19 | 82 | 15 | 21 | 36 | 5 | 9 | 0 | 8 | 13 | 6 | 2 | 0 | 0 | 1 | 4 | 6 | 3 | 4 | 6 | |
| | Total, ..... | 10 Jemadars, | 3 Inspectors. | 251 | 15517 | 8880 | 1732 | 10612 | 2192 | 2713 | 4905 | 945 | 1 | 6 | 1221 6 | 5 | 6 | 147 8 | 15 2 | 0 | 126 | 9 | 0 | 274 1 | 8 | 0 | |

E. E.

*Bareilly, Magistrate's Office, the 5th July* 1844.

(Signed) H. CLARKE,

*Magistrate.*

# No. II.

## Revenue management of the Ajmere district in F. S. 1251, A. D. 1843-44.

*Extract para: 1 to 8 of a letter from Superintendent at Ajmere, to Commissioner of the Ajmere Division dated 27th July* 1844,

*No.* 20.

Para. 1. I have the honor to forward for the information of the Hon'ble the Lieutenant Governor a statement showing the returns of Revenue during the past F. S. year 1251, as compared with the previous year, and to add such further observations as seem necessary in reference to the steps that have been adopted for ameliorating the condition of the people and of advancing the general improvement of the district.

2. In this part of India, where the periodical rains are uncertain and the falls generally slight, the prosperity of the district hinges in a great measure, on the favorableness or otherwise of the season. Ajmere is so situated as almost to be too remote to share in the showers which are generated in and come down from the Himalaya mountains, while on the other hand, the clouds from the Gulph of Cambay scarcely extend beyond Serohee. Thus a bad season, with us forms the rule, and a good one the exception. The past season was, upon the whole, favorable, for with the exception of Ajmere Khas and within a radius of eight miles, the rain was general and the greater portion of the tulaos in the Ramsur and Rajgurh pergunnahs were filled. The zemindars, roused from their pristine lethargy by the great attention paid by the Government to the improvement of their condition, had been particularly assiduous. Large tracts of land, heretofore unacquainted with the plough, had been brought under culture. This feeling of industry was not confined to any isolated portion. It pervaded, as it were, by general consent, through the whole of the Khalsa possessions. At no former period, perhaps, had cultivation assumed so extensive a form; and at no previous time had promise been more sanguine. My report under date 2nd September 1843, written after a personal inspection of each village enters fully on the subject of the expectations from the Khurreef crops. At that period there was a confident hope that the out-turn of

the khurreef revenue would equal the average amount of the khurreef and rubbee during the foregoing three years, leaving the rubbee crop as a surplus. The crops continued to advance and the hopes of the people to rise, until the month of October, when the district was, as it were, inundated with swarms of locusts. The extent of injury done by these visitations can alone be appreciated by those who have been witnesses to the devastation thus caused. I was marching through the district at that period, and had ocular proof of the destruction caused to the cultivation. Nothing escaped the ravages of these insects but rice and sugarcane. The til plant was eaten close to the soil, not even leaving a vestige of stubble; mukka, jowar and bajra had the ears eaten off, or were so injured by the slime of the locusts as to die *per se*. At this juncture, we were so fortunate as to receive, contrary to season, continuous showers of rain, which admitted of the mukka and til lands being immediately turned up and sown with chunna. Our expectations from the khureef had been floored by the ravages of the locusts. But as the latter part of the season was unusually favorable, every nerve was strained to recover our loss, through the medium of a more extended rubbee. The issue has fully realized expectation. For the rubbee harvest was gathered in without our suffering from frost, hail, smut, or any of the numerous vicissitudes inseparable from agriculture, and the accompanying returns shew that the amount of the khalsa revenue during the past season is, as compared with the decennial settlement, Rs. 26,905-5-9 in excess, or in comparison with the juma of the preceding year, it gives an increase of Rs. 42,519-3-6¾. This result is far below the line marked by reasonable expectation. But in such a season, which has been more severely felt in adjacent principalities, which are alone dependent on the khureef, we have much cause for thankfulness that our subjects have not only been provided with the means of livelihood, denied to some of our neighbours, but that with their benefit, we have reaped a considerable increase of revenue beyond former years.

3. It is necessary to bear in mind that the decennial settlement was based on the principle that the Government take one half of the produce. On settlement villages becoming kham, the same course has obtained. The crops have been assessed according to the Kun-koot, and the market price of one half the produce has been paid as revenue. During the last two years the Government of Agra has been pleased at my solicitation to take two-fifths in place of one-half of the produce. And in estimating the increase over the settlement juma, the circumstance of the reduced share the Government now taken should receive consideration. So satisfied am I of the advantage, alike accruing to the cultivator and to the State, by this reduced share, that an early opportunity will be taken to solicit its continuance during a further period of two years.

4. The returns of the Pergunnah Officers in reference to the agricultural improvements with which Ajmere has been enriched during the last two years are extremely satisfactory. A spirit of industry has arisen wholly unknown in former times in the district and which, with moderate conciliation and common justice, will continue to increase with years: affording to the cultivator a provision for an enlarged family, a thing consequent on industrious habits, and ensuring to the Government a prompt and cheerful payment of its dues. I have in various former reports descanted, perhaps at unpardonable length, on the comportment of the people of the district when I was called to its charge. The people at that time were wholly devoid of energy. There was a marked indisposition to exertion and a total callousness as to an improvement of circumstances. Litigation seemed to be their legitimate calling. To quarrel with each other and refer to the Courts at Ajmere, or to aid their brethren in a cause of this nature, were matters of pleasure; as an instance of this litigious feeling, it may be observed that it was a common remark that in the Qusbah of Ramsur containing 300 families there were 400 *jhugras*. This feeling was by no means restricted to Ramsur. It was the marked characteristic of the district. To have urged the people to become industrious, in improving their lands by sinking wells or raising small tulaos would have been fruitless labour. They had followed the path treaded by their ancestors and were unsolicitous to beat out any new tracks. The reason was obvious. They had no guide to point out the path of industry and consequent competence. The intercourse between the ryots and the rulers was restricted to the paying of rents, and to the administration of justice through the Adawlut, where the principals having made over their cases to vakeels, suffered alike from delay and expense; for a common matter of everyday occurrence, which might have been settled by four heads of villages to the mutual satisfaction of the parties by the district Officer, was now by the ingenuity of the vakeels, whose existence depends on strife, spun out to an interminable length. Thus apparently there was little sympathy between the authorities and the cultivators. But the liberality of the Government, in identifying its interests with those of the people has wrought a change which has far exceeded expectation. In providing extensive tank embankments for almost every village at considerable outlay, the zemindars have an undeniable proof that the improvement of their means is the settled determination of the Government. Following the good example set them, the people now devote the whole of their time to agricultural pursuits. Litigation, idleness, and poverty are now being superseded by peaceful industry and cheerful habits. All matters of dispute amongst villages are referred to the pergunnah tehseeldar who, with the aid of a punchayet, settles the matter on the spot, or should the case be involved in difficulty, it remains till my camp arrives in that quarter, when the matter is adjusted before me. Thus, so far as relates to the cultivating class,

their wrongs are immediately redressed, by the decision of their peers without being subject to the inconvenience and expense of referring to the Ajmere Adawlut. Ramsur has been mentioned as a place teeming with squabbles. We should therefore view it in a fiscal light under present arrangements. The jumma of the decennial settlement was fixed at Rupees 7000. For some years past it has been Kham, when owing to the dissensions among the people, little more than half the sum was realized. Now there is neither feud nor disagreement, and the consequence is, their energies have been devoted to their immediate vocation, and we have a return this year of Rupees 9,215-5-3, which sum would have been materially increased but for the ravages committed by locusts. A reference to the subjoined return shews the additional means agriculture has received during the last two years. 915 new wells have been dug, of these 627 are completed and 318 are in course of construction;—(the wells cost from 50 to 200 and 250 Rupees each)—again, 334 narees or small Zumeedaree tulaos containing from 20 to 200 beegahs of water have been or are in course of completion. These works are intended for irrigating Indian corn sown to the rear of the embankments during the break in the rains, while the front on the removal of the water is sown with barley and gram. The rapid strides the cultivators have already made in the good cause of improvement prove the earnestness with which they have taken to industrious habits.

5. Various arrangements have been made for the better Government of village communities; among these it may be mentioned that, that for keeping the village community expenses under due check is one of the principal. It was the custom of the Potels and Putwarries to run up in most instances a fictitious bill each season, chiefly for their own benefit, The community was amerced as much as 2 or 2½ annas per plough, khureef and rubbee, independently of their share of revenue and dues to the village servants. The consequence was, the cultivator was defrauded of much of his own earnings. Now the Mulba Khurch expenses are submitted for sanction to the delight of all parties save the Potels and Putwarries.

6. I have not thought it necessary again to allude to our Tank embankments concerning which I have so recently addressed you. They are the foundation and mainspring of all our present and expected prosperity. Precept would have had little effect on the minds of the people unless supported by example.

7. In view to bring into efficient cultivation the numerous patches of waste land distributed though the Khalsa villages, 30 new hamlets have been planted all of which promise in the course of a few years to expand in size and utility. They are all dhakilee or subordinate to the parent village. Their non-separation obviates many objections which might be started. Besides,

boundary marks remain undisturbed. In former days the location of a new hamlet on Khalsa land was considered no small undertaking. Three Kheras have thus been established since our rule. But we gained little immediate advantage; for during the first 5 or 6 years no rent was levied and large immunities were granted in future. Now business is done in a more workmanlike way. Five Rupees are given for the inauguration, and such of the new assamees as require pecuniary aid for the purchase of bullocks or for sinking a well have their wants relieved. We take our share of the revenue at once, giving the new settlers a remission of one or two shares according as the ground is new or arable during the four years. After this period they are rated the same as old villages.

8. The lateness of the rains has not allowed of my obtaining a detailed list of the ploughs in the different Pergunnahs. They have however undergone a considerable increase, for most of the idlers in each village have been or are about to be converted into cultivators. Raegurs, Bullahees, Chumars, and other low castes whose forefathers never handled a plough, have taken most kindly to their new vocation. In some instances the peaceful tailor has taken to sinking a well. Under these circumstances the Jaut, Googur and other cultivators cannot remain in the back ground.

*Abstract of Wells and Narees sunk and made, or in course of construction during the last two years, in the AJMERE Khalsa Villages.*

| Name of Pergunnah. | Wells. | | Narees. | | Remarks. |
|---|---|---|---|---|---|
| | Ready. | In course of readiness. | Ready. | Being made. | |
| Ajmere Pergunnah, .. | 105 | 79 | 32 | 71 | |
| Seree Nuggur and Ramsur Pergunnahs | 181 | 135 | 81 | 33 | |
| Rajgurh Pergunnah, .. | 276 | 65 | 32 | 42 | |
| | 562 | 279 | 145 | 146 | |
| Ajmere Pergunnah Settlement Villages, . | 65 | 39 | 20 | 23 | |
| Total, .... | 627 | 318 | 165 | 169 | |
| Grand Total, .... | 945 | | 334 | | |

(Signed) C. G. DIXON,

*Superintendent.*

*Superintendent's Office,*
AJMERE,
*The 27th July*, 1844.

## *AJMERE.—Abstract of Land Revenue.*

| Number. | Name of Tehseel. | Name of Pergunnahs. | Land Revenue. | | | | | | | | | Decrease. | | | | | | Increase. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Decennial settlement in 1243 F. S. or 1835-1836. | | | Kham collection Khureef and Rubbee 1250 F. S. or 1842-1843. | | | Kham collection Khureef & Rubbee 1251 F. S. or 1843-1844. | | | As compared with the Decennial Settlement. | | | As compared with the Khureef and Rubbee 1250 F. S. or 1842-1843. | | | As Compared with the Decennial Settlement. | | | As compared with the Khureef and Rubbee 1250 F. S. or 1842-1843. | | |
| 14 | Rajgurh Tehseel,..... | Rajgurh, ..... | 38036 | 0 | 0 | 36577 | 1 | 8¼ | 41073 | 10 | 10 | 2753 | 4 | 7 | 1145 | 0 | 9 | 5790 | 15 | 5 | 6541 | 9 | 10¼ |
| 29 | Ramsur Tehseel,..... | Ramsur and Seerce Nuggur, | 44250 | 0 | 0 | 35094 | 6 | 4 | 61145 | 15 | 7 | 0 | 0 | 0 | 9 | 2 | 4 | 16895 | 15 | 7 | 26060 | 11 | 7 |
| 18 | Ajmere Tehseel,..... | Ajmere and Kekree, ..... | 25876 | 10 | 9 | 14826 | 12 | 10½ | 23614 | 6 | ¼ | 4297 | 9 | 0 | 0 | 13 | 3 | 2035 | 4 | 3½ | 8788 | 6 | 5 |
| 61 | Total of kham management,..... | .. .. | 109062 | 12 | 9 | 86498 | 4 | 11½ | 126734 | 0 | 5½ | 7050 | 13 | 7 | 1155 | 0 | 4 | 24722 | 3 | 3½ | 41390 | 11 | 10½ |
| 23 | Ditto under Settlement,..... | .. .. | 17703 | 5 | 3 | 17703 | 5 | 3 | 17703 | 5 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | Do. formerly under kham management, | .. .. | 1850 | 12 | 6 | 1565 | 3 | 6 | 2693 | 11 | 2½ | 248 | 14 | 9 | 0 | 0 | 0 | 1091 | 13 | 5½ | 1128 | 7 | 8½ |
| 2 | Ditto Medah and Mahomed Kehrs,... | .. .. | 0 | 0 | 0 | 1095 | 5 | 0 | 1095 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1095 | 5 | 0 | 0 | 0 | 0 |
| 91 | Total of Khalsa villages,..... | .. .. | 128616 | 12 | 6 | 106862 | 2 | 8½ | 148226 | 5 | 11 | 7299 | 12 | 4 | 1155 | 0 | 4 | 20909 | 5 | 9 | 42519 | 3 | 6½ |
| 73 | Ditto of Istumrar villages,..... Including Shahpoora and Phoolea,.. | .. .. | 122716 | 5 | 8½ | 122716 | 5 | 8½ | 122716 | 5 | 8½ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Miscellaneous Land Revenue,..... | .. .. | 0 | 0 | 0 | 6761 | 2 | 10 | 7615 | 7 | 6½ | 0 | 0 | 0 | 0 | 0 | 0 | 7615 | 7 | 6½ | 854 | 4 | 8½ |
| 164 | Grand Total of Land Revenue,..... | .. .. | 251333 | 2 | 2½ | 236339 | 11 | 3 | 278538 | 3 | 2 | 7299 | 12 | 4 | 1155 | 0 | 4 | 34524 | 13 | 3½ | 43373 | 8 | 3 |
| | Deduct decrease,..... | .. .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 7299 | 12 | 4 | 1155 | 0 | 4 |
| | Actual increase of Land Revenue,..... | .. .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 27225 | 0 | 11½ | 42218 | 7 | 11 |

# No. III.

*Selections from a Report on the Revenue administration of Zillah Bareilly, during the year* 1842-43, *by Mr. Henley Clarke, Collector, dated July* 14*th*, 1843.

PROCEEDINGS OF GOVERNMENT, REVENUE DEPARTMENT, NOVEMBER 1844.

Prices.

9. The price of raub or sugarcane juice and raw sugar has remained firm, notwithstanding the produce having been very abundant, a circumstance which tended materially to sustain many of the villages whose staples were rice and sugar, under the straits to which they were reduced, by insufficiency of rain. The average selling rate of rice has risen about 12 per cent. on the prices of the previous year, while on the other hand all the rubbee grains have fallen 24 per cent. below the last year's prices, the result probably of the favorable state of the harvest in general throughout the North Western Provinces, so that we may calculate that there has been a net fall of about 12 per cent. in the price of agricultural produce in 1842-43 compared with 1841-42.

Discount, rate of, on Bareilly and old Furruckabad Rupees. Amount specie and Bullion.

10. The average rate of discount on old Furruckabad and Bareilly Rupees in exchange for Government Coin has been Rs. 1-2-0 per cent. the rate demanded at the Treasury being 3·4 per cent. for the former and 4 per cent., the latter. The amount of specie of all kinds in circulation in the District is estimated by the bankers to be about Rs. 91,00,000 which may be thus divided (1) Bareilly and old Furruckabad Rs. 50,00,000—(2) Government Silver Coinage 35,00,000 Rs.—(3) Gold 5,50,000 Rs.—(4) Copper 50,000 Rupees worth. There are also calculated to be 20,00,000 Rs. in Silver bullion, and 15,00,000 Rs. value in Gold bullion, made up into ornaments, jewelry &c. &c.

11. The average gross produce of the District may be estimated at about 65,00,000 Rs. in value per annum, of which 40,00,000 may be set down to the khureef and 25,00,000 to the rubbee harvest.

Export and Import trade of agricultural produce.

12. The cultivators receive probably three-fifths or 38,00,000 Rupees' worth of the above quantity, while of the remaining two-fifths the Malgoozars' share may be assumed at 900,000 Rs. or one-third and that of Government at Rs. 18,00,000. The surplus produce exported in ordinary seasons, as far as can be ascertained, is about Rs. 11,00,000 or one-sixth of the whole, vizt. seven lacs of khureef and four of rubbee crops.

Estimated agricultural produce how—disposed of.

13. Of this the former finds its way almost exclusively by land carriage to the western marts of Khasgunge, Hatrass, Agra, and Bikaneer at the enormous cost of from 56 to 70 Rupees for land carriage hire per 100 maunds from Bareilly to Hatrass, a distance of only 120 miles, that to the other places mentioned being in proportion, a fact which forcibly points out the paramount importance of devoting our energies to the removal of all obstacles to a free and easy communication between the roads of pergunnahs running east and west and of facilitating intercourse on the great lines of traffic in Rohilcund leading to the western marts.

Expenses of cartage of Exports and importance of good roads.

14. The latter or the rubbee exports are transported by boats on the Ramgunga and Ganges to the eastward at the following rates of hire per 100 maunds.

Expenses of water carriage.

| | | | | | | |
|---|---|---|---|---|---|---|
| From | Bareilly, | to | Cawnpore, ... | From | 14 | To 16 Rs. |
| | Ditto, | „ | Allahabad, ... | From | 25 | To 27 Rs. |
| | Ditto, | „ | Mirzapore, ... | From | 28 | To 30 Rs. |
| | Ditto, | „ | Benares, ... | From | 30 | To 32 Rs. |

15. No trade is carried on below Benares with this Province except in Sugar and Indigo to a limited extent by a few European landowners.

No trade below Benares; exceptions.

16. The staple exports consist of three lacs of rupees of raw Sugar (more or less) the same quantity of rice, four lacs of wheat and other grains, and about one lac of miscellaneous articles. A small but interesting

Assumed value of staple exports and trade with the Hills.

trade is also carried on during six months of the year with the Hill tribes at Burmdeo and Huldawanee in sugar, cloths, and culinary vessels, in exchange for borax, condiments, grocery and other trifling articles of hill produce.

Largest imports.

17. The largest imports are cotton, salt, cloths and specie.

Causes influencing the ebb or rise of the market.

18. The traders come early in each season and wait their time to buy at the most favorable period, and so much depends on their arrival, to produce a healthy state of the market, that the evils of poverty are occasionally felt in the midst of plenty from a want of purchasers.

Mode adopted for paying the kists during a low state of the market.

19. A few Malgoozars only are possessed of sufficient capital to admit of their paying their kists, without either disposing of their produce or borrowing for that purpose if they do not sell. These individuals, if the state of the market at the time of paying the Revenue, may be such, that to sell would be attended with a great sacrifice, usually draw on their capital or uninvested funds deposited in the hands of the native bankers, and either hold their crops until the market improves or send them to other marts after insuring them, where they are often able to dispose of them to great advantage while others also find it even more profitable to borrow at a high interest and to wait their opportunity of afterwards disposing of their produce than to sell it in the existing state of the market.

Influence of an improvement in the means of communication on the western trade: advantages of continuing the Aonlah road to the Ganges.

20. Before closing these remarks, it appears worthy of notice, that since the new road has been opened from Pilibheet to Aonlah and the nullahs and swamps bridged over and the means of communication improved in the direction of Hattras, the western trade has continued to a limited extent, whenever the price of the export promised a fair remuneration at all seasons of the year, whereas formerly the difficulties of the road were so insurmountable during the rains and the risk of injuring the cattle so great, that the capitalist was unable to procure carts at any rate of hire that he could afford to give for transporting his produce at that season, whatever might be the demand in the western markets. Thus although wealth is created by industry, this latter requires the stimulus and aid of either good roads or canals for its development and the value of landed property will probably in no small degree depend on the improvement of the present tedious and expensive means of communication. The continuation of the road above mentioned to the banks of the Ganges would confer a great advantage on the country at large.

Results of the past year.

44. On the whole I hope that the results of the past year will be considered as cheering. The transition to a more healthy condition amidst the combined disadvantages of partial failures, during too a succession of seasons, of one of the staple products, the influence of disease and other hindrances, has been steadily progressive, while wherever obstacles have been found to impede the advance of prosperity the causes have been sought out, and the villages, affected by them, extricated from their difficulties.

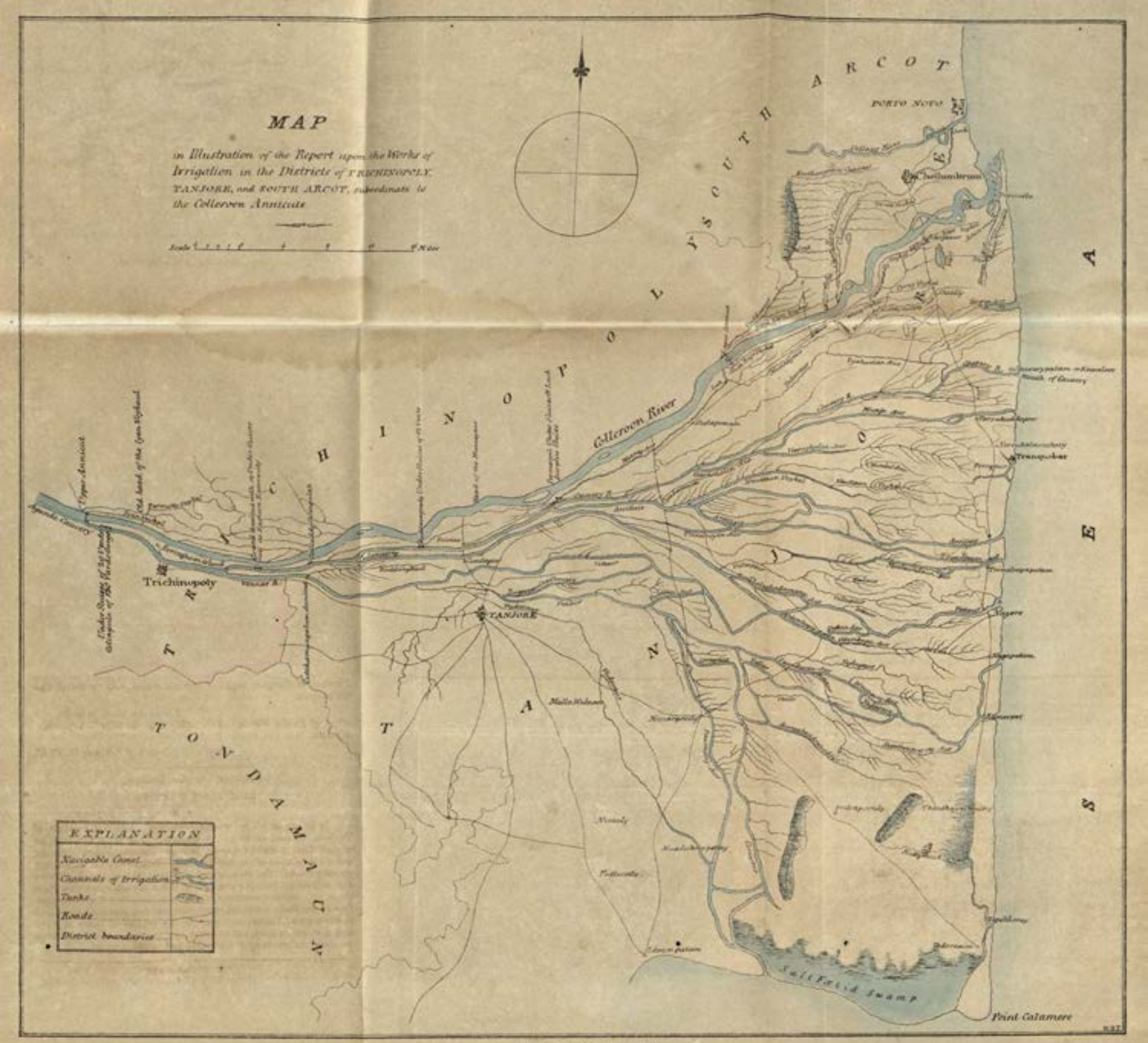
Data for the opinion that prosperity is on the advance.

45. This opinion is based not only on the fact of almost all land, on which the investment of large sums in clearing or manuring are not required, having been brought under cultivation or in the rise of the Abkaree Revenue from Rupees 25,992 in 1838-39 to Rs. 83,896 in 1843-44, more than 200 per cent, or the reduction of the rate of interest or the increase of the standard of the comforts of life among all classes, or the tranquillity of the country and decrease of crime, the infrequency of sales of landed property on account of revenue balances but in the competition for land, as the safest and most profitable resource for the employment of available capital.

Data showing increase in the value of landed property.

46. In confirmation of this increase on the value of landed property, especially since the settlement under Regulation IX. of 1833, I beg to subjoin some statistical data of transfers by private sales being the average of several villages for each period taken at random from the record office.

| Year. | No. of cases. | Rate of the sale price per acre on the aggregate rucbas of estates sold. | | | | | | | | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | On total Area. | | | On Malgoozaree. | | | On Cultivation. | | | |
| 1809 | 4 | 0 | 1 | 10¾ | 0 | 2 | 6 | 0 | 3 | 3 | There are no traces of any private transfers before 1809. And there were only four cases in that year. |
| 1816 | 10 | 0 | 7 | 2¾ | 0 | 9 | 1 | 1 | 3 | 5 | |
| 1823 | 10 | 2 | 12 | 11 | 3 | 1 | 3½ | 4 | 6 | 6 | |
| 1833 | 10 | 2 | 10 | 2 | 3 | 8 | 9 | 4 | 6 | 2 | |
| 1843 | 10 | 5 | 5 | 6 | 6 | 4 | 1 | 7 | 10 | 8 | |




Printed at the Agra Orphan Press

# No. IV.

*Irrigation Reports and Maps of the Presidency of Madras; forwarded by the Secretary of the Board of Revenue, Madras.*

No. 521.

FROM CAPTAIN S. BEST,
*Secretary to the Board of Revenue,*
*in the Department of Public Works.*

To R. CLERK, ESQUIRE,
*Acting Chief Secretary to Government.*

SIR,

With reference to the concluding paragraph of the Memorandum which accompanied my letter of the 8th ultimo, I have now the honor, by desire of the Board of Revenue, to forward the copy of Major H. C. Cotton's memoir* on the irrigation of the Province of Tanjore, together with additional plans connected with the subject.

I have the honor to be &c.
*Dept. of Public Works, Madras, 24th Oct.* 1842. } (Signed) S. BEST, *Captain,*
*Secy. to the Board of Revenue D. P. W.*

NOTES ON THE 5TH DIVISION,

BY MAJOR H. C. COTTON,
*Acting Civil Engineer.*

It is impossible to become acquainted with the Province of Tanjore, without viewing with admiration and wonder, the degree of perfection to which the irrigation was brought before even the British possession of the country, and indeed before the date of any existing record. The main branches of the Cauvery, with the branch that retains the parent name, the minor channels separating from those, and the innumerable ramifications threading the whole surface of the Delta are so disposed, that one can scarcely believe that it was a gradual work, each portion the accidental result of what had been before done, but the work of consummate skill and science planning the whole system at once, and establishing it.

* *Dated 10th March.*

Changes have taken place during the last 40 or 50 years, disordering in some measure the irrigation of certain tracts, and remedies have been of late years applied, but these have been almost entirely confined to restoring those tracts to the condition they had been in at some former period. But viewing the system generally, we find the levels of the main branches perfectly well adapted to supply the smaller, and these to distribute again the water to the lands, apparently with the least possible waste of labor in the excavation of channels, the least multiplication of sluices and aqueducts, to give the supply the different levels required, and the most convenient distribution to the various villages and farms while the drainage of all is at the same time most admirably provided for.

The difficulty of obtaining a full supply of water in the Cauvery or southern main branch for the irrigation of all Tanjore has been the grievance of ages; Colonel Caldwell imputed it to the beds being so raised by the accumulations of sand from the Colleroon head to the sea, as to turn the water into the course of the latter river, and declared his opinion that though temporary measures might improve the supply, nothing but opening the mouth of the Cauvery and forcing a great body of water by that course to the sea could carry off the continual influx and accumulations of sand, and therefore nothing else could keep the beds on a sufficiently low level to ensure a supply of water; and he anticipated that in not many years, the rivers would be dry, and the country ruined. This was I believe in 1803: he raised the grand Annicut where the bed was high, and where in consequence great part of the water escaped to the Colleroon. This was the first improvement, but it was temporary; the supply fell off and an opening about two miles from the present head of the Colleroon through which a great body of water passed back to the Colleroon was closed, thus throwing the separation of the rivers further west, and taking advantage for the moment of the deep channel then forming the head of the Cauvery. This was soon found to be a mere temporary improvement; the deep channel filled with sand, and the river was as badly supplied as ever. This was the second attempt, partially successful for a time, but not at all rising above the fears and anticipations of Colonel Caldwell. His prophecy was growing more fearful, and its realization apparently more near at hand. It was then proposed to make sluices in the bank between the Cauvery and Colleroon for the purpose of discharging surplus water with a view to clear the Cauvery in a measure of its accumulating sands. This was the third experiment or rather the third improvement for they were all such in a greater or less degree—and this was decidedly a radical and permanent one, leading to no harm because an agent under command, to be employed when, and in whatever degree desired; and to a certain extent, as I shall show, beneficial to the river at the time and still more so eventually.

The river bed, at the grand Annicut and below that, was much lowered, but near the head where the other set of sluices are, no

change was effected, because the two rivers being so nearly on a level at that spot, there was no strength of current through those sluices and no sand discharged. The supply of the river fell off again, and with yearly increasing rapidity; and in 1835, there was so great a difficulty towards the close of the season to draw by means of a Corumboo any water into the Cauvery, that in all probability the next season would have been as nearly as possible what Colonel Caldwell had prophesied. But here I must remark that the evil, though the same, was not by any means from the same cause as that on which he grounded his prophecy. Had the bed of the Cauvery been ever so wide and deep, towards its mouth, this evil would not have been averted, the supply could not in the slightest degree be affected by it; for suppose the bed of a river to be raised 15 feet at a distance of 60 miles from its source, and suppose the fall in those 60 miles to be 135 feet, and to be thus reduced to 120 feet, the diminution of supply would be 1-18th only and such a change is beyond, what has I believe any where taken place in the course of ages; the beds of many of the rivers no doubt rise gradually, when not well supplied with water in high freshes, or when altogether without vent, but that is comparatively a very trifling and remote evil as affecting its supply, and in like manner the deepening of the extremities would be but a trifling and remote improvement: as long as the parent channel continues deeper or has a greater fall than the branch at the point of separation, the branch suffers from the formation of sand banks at its head, this is always the case in all the channels small and great and this has been the great cause of failure in the Cauvery itself and has rapidly followed every improvement of the river which left the Colleroon still the deepest channel at the point of separation, as well as with a greater fall. The raising of the bed of the river originally established an elevation above the bed of the Colleroon, and this no doubt must be considered the primary, though not the immediate, cause of the evil, and none of the former improvements tended to counteract it; but the same cause remaining, the same effect ensued, whether that cause increased or diminished. So likewise the deepening of the lower parts is a primary step to the restoration of the original level and fall of the river, but this can never amount to the fall of the Colleroon which takes a shorter course to the sea and therefore never can remove the evil entirely. Here therefore is the reason that the under sluices alone could not prevent the closing of the head of the river though they deepened the bed for many miles of its course. All of them being too far from the head to affect it at all, except the first set which till the Annicut was built had not sufficient fall.

The river as I stated above was deepened at a distance of 20 miles from its head by the use of the several sets of sluices and there was ample capacity at the grand Annicut for a full supply of water if it could have been brought there, but the head itself was

choked with accumulations of sand, and the supply diminished in proportion.

It is very remarkable that the beds of the rivers generally do not appear to have risen since the period of Colonel Caldwell's report. No accurate observations have been taken to prove this, but I can discover no grounds whatever for supposing that they have risen. One proof of this fact is that the rocky bed of the Vennaur 8 miles from its head is bare rock still, and as far as is known, this part of the river which would so plainly show a change is in the same state as it was 50 years ago. Another proof is that of all the channels which fall into the rivers, for the drainage of the land, none that I can discover have ever become choked by the rising of the bed of the rivers. I feel convinced that the outlets for the sand, (through which during high freshes and during the heavy local rains much water escapes to the sea) have been nearly, if not quite sufficient to prevent any such rising of the beds as Colonel Caldwell anticipated, and on which his prophecy of the ruin of Tanjore was grounded. The grand Annicut certainly required to be raised, to accord with the then state of the river-bed and it was there, no doubt, that much of the supply of water was lost, but I feel convinced that even at that time the head of the river was the main seat of the evil. Much money was expended from time to time in deepening the head, and raising temporary Corumboos as well as on the great work of closing what was called the Govinda Calagum above referred to, and by these means the battle was fought inch by inch, but it was after all a retreat before an overpowering enemy, delaying the conquest, but without a prospect of victory, until the weaker party was joined by a strong ally, and an entirely new arm was brought into the field. This new and most opportune work was the upper Colleroon Annicut projected by Captain A. T. Cotton after much study and experience, the effect of which has been found perfect; giving the Cauvery its full supply of water as long as there is so much in the entire river above, and giving such power to the upper (or 20-vent) sluices in the Cauvery bank as to keep the head of the river permanently deeper than that of the Colleroon and therefore the first of the two rivers to be supplied in times of scarcity.

The Annicut alone would have unfailingly supplied the Cauvery with its water, and the head would never I think have been liable to close up as before, but in combination with the sluices it gives a perfect command over the bed of the river which is an advantage scarcely within the view of those who most deeply studied the project; had Colonel Caldwell's project of deepening the river towards the sea been effected, and as he anticipated from it, the whole river deepened throughout its course, what would have been the consequence. The whole system of the irrigation of the district would have been disordered. The lowering of the beds

which now command the lands would have caused the branch channels to require dams every where, to raise the water to them or new branches from a distance above those which now supply the fields would have been required, while the head of the river totally uninfluenced would have continued as it has done to close with sand, and the supply of the river to fall off.

The upper Colleroon Annicut was built in 1836 and there were at that time four sets of sluices in the Cauvery bank for the discharge of sand, vizt. the 20-vent sluices 2 miles, the Vuddavagoody sluices about 35 miles and the Permaul Coil 50 miles from the head of the Colleroon. These were kept in use when water could be spared during the five first seasons and from all that could be discovered (by no very accurate observations) the river beds had rather deepened than otherwise, but certainly no very important change had taken place. In consequence of some alarms being expressed as to the effect of the Annicut in throwing into the river more sand than could be discharged, I thought it desirable to make as good a trial as possible of the season of 1841, by not opening the sluices of the Grand Annicut and those to the eastward; and the long continuance of the high freshes has made the season one especially well calculated to give the river an unusually great influx of sand, while the monsoon being very light, the lower parts of the river did not receive the cleansing which a heavy monsoon ensures, the local rains having the effect of discharging vast accumulations of sand into the sea while they introduce none. Still the sections taken show no increase of sand, but rather a decrease. Accompanying my report of 9th March 1842, is a set of sections shewing the changes in the bed of the river during the season and with one or two exceptions out of 40 sections the bed is lower at the close of the season than before.

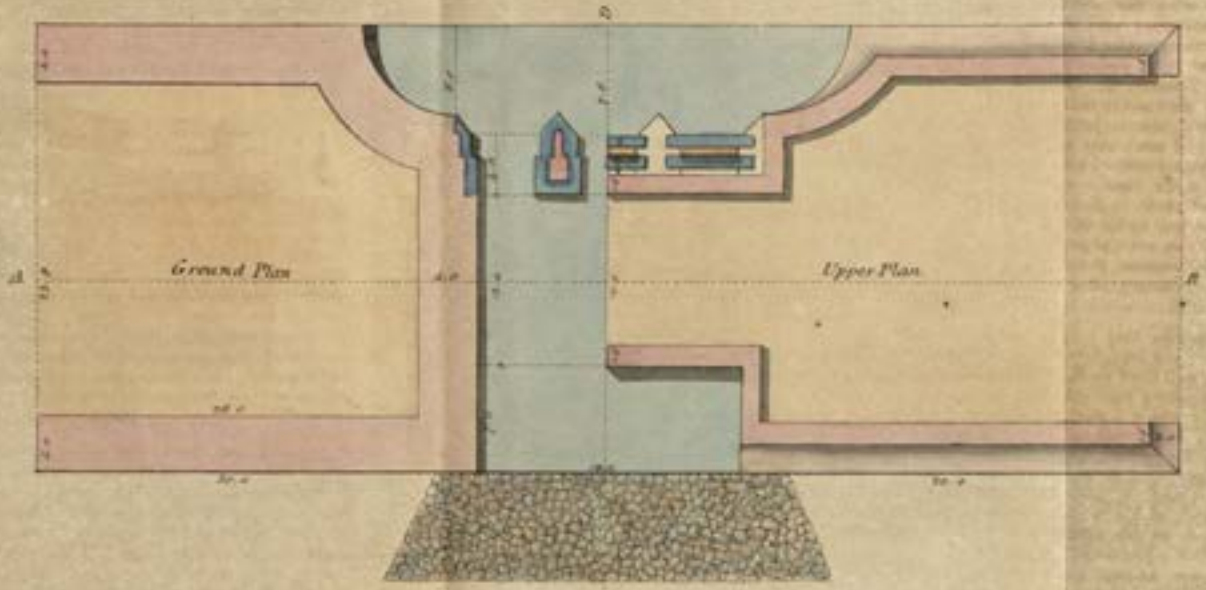
A considerable change has in the course of the six seasons taken place at the separation of the Cauvery and Colleroon. The deep channel of the main river was along the north side leading down into the Colleroon, the south side being raised with sand banks and the head of the Cauvery itself choked up with them. The effect of the Annicut was to throw a strong stream directly across the head of Seringham, sweeping out a very deep channel of no considerable mass of sand and opening the head of the Cauvery during the season. The Cauvery was then secure of a full supply of water as long as the main river could furnish it, and though there was an unheard of scarcity of water in the main river that year, the crops throughout Tanjore were tolerably abundant. There can be no doubt, had the Annicut not been built, that every year the loss would have been incalculable and in the 2nd, 3rd and 4th years the south west monsoon was also exceedingly light, and the river very scantily supplied, so that the benefit of the Annicut was in fact

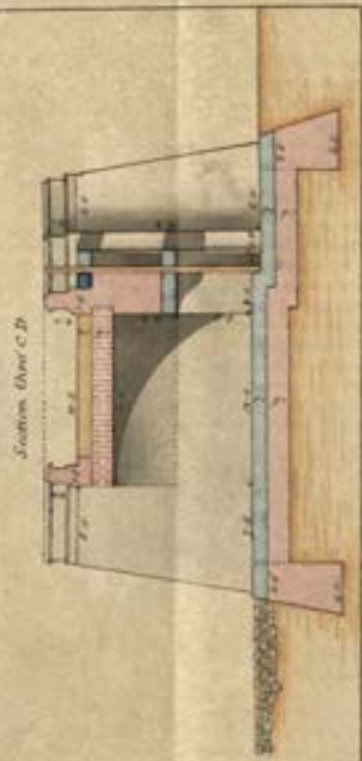
felt to a degree which no foresight could possibly have anticipated, but which making no very palpable appearance in the revenue accounts unsupported by the consideration of the deficient supply of water in the main river, has not earned for the work that credit, which its immense effect gained, where the circumstances were all known. The revenue of Tanjore being so materially affected by the varying price of grain makes it difficult to show distinctly the benefit the district has derived from the Annicut, but the price of land gives a very remakable proof of its effect and to show the feelings of the people most interested and best able to judge of the actual advantage derived from the Annicut, I need only to repeat what has been often said to me, that at the expense of one rupee per vaily of land, the work could be built at the expense of the people, *annually* (if necessary) with immense profit to them, quite independently of the increase of revenue obtained by Government; and these remarks have been backed by an offer of one rupee per vaily from the land holders under the Vennaur, if the Government would build an Annicut across the Cauvery at its head: a sum of about 30,000 rupees.

Since the construction of the Colleroon Annicuts, they have been annually improved and strengthened and are now brought to the condition of good permanent works, not only well fitted for the purpose for which they were constructed but requiring very trifling annual repairs. The centre branch of the upper Annicut was lowered last year; its present height 4½ feet being sufficient to throw into the Cauvery a full supply of water for all Tanjore. The lower Annicut is now to be raised 4 inches and covered with cut stone which seems to be at present all that work requires. The raising is chiefly intended to add to the supply of the Vuddavaur and Veeranum for the benefit of the lands on the north side of the Vellaur river, across which an Annicut is proposed to be constructed. The lands irrigated by the lower Annicut are the Talooks of Mannargoody and Chellumbrum in south Arcot and a considerable tract of country along the south bank of the Colleroon extending to the sea.

The 20-vent sluices have been greatly improved by the enlarging of the vents; they now discharge a great body of water in high freshes, and of course also a great volume of sand and are I think in plan as well as in effect an excellent work: this is the first outlet from the Cauvery to the Colleroon. They have been strengthened by rough stone defences, and seem to be very secure.

The 150-yard Calingulah is the next outlet for flood water, and by this a considerable quantity of sand also escapes. The work has no solid apron, but one of loose stones, which has been annually improved by the addition of rough stone and the whole work is now in good order. A foot bridge was constructed on the crown of it in 1838.




# PLAN of a SLUICE

as drawn out for regulating the water in the Channels

## TANJORE DISTRICT

The grand Annicut is the third outlet. It has 350 yards gorge, and ten vents through its base, and the fall between the two rivers being here considerable the discharge both of sand and water is very great.

On the shapeless body of this ancient work is a bridge of 30 arches of 30 feet each, constructed in 1838 and an extremely useful communication.

The Coiladdy Calingulah of 100 yards gorge and still greater fall than that at the grand Annicut is the fourth outlet, and has an immense effect on the floods of the river, discharging in the highest freshes about half the water that reaches that point, with much sand also. A low apron was added to this work last year and it is now in good order, but it would be the better for a covering of cut stone. The bride over the Calingulah makes it a very complete work.

The Vuddavagoody sluice is the fifth outlet, it has 12 vents and is a low work discharging water over it in the floods (having been lowered four feet since its construction). The body is of great thickness and contains a considerable mass of cut stone work and brick masonry that might have been dispensed with, without diminishing its strength ; a low apron was found necessary to secure the foundations and was added last year.

The Permaul Coil sluice is the sixth and last point of discharge for the flood waters of the Cauvery ; it has 6 vents. The water passing out by this sluice falls into the Munnyaur and is discharged from that channel by another sluice into the Colleroon. This arrangement limits the use of this sluice, and I think it would be very desirable to carry the water from it under the Munnyaur direct to the Colleroon. It might then be used freely for the discharge of water in times of flood, as well as for sand for which alone it was intended. It would be necessary to carry the Munnyaur by an aqueduct over the channel leading from the sluice to the Colleroon on account of the navigation, and on this account also a new channel would be required from the Permaul Coil lock to the Munnyaur.

Previous to the construction of the Colleroon Annicuts, much pains were taken so to regulate the distribution of water as to give a fair proportion to each main branch, and several important works were constructed for the purpose ; and although the abundance of the total supply for the district has rendered this a less important consideration it still requires attention. The Vennaur river which is the first main branch has always been ill supplied in comparison with other branches. Some improvement has been made, in the last two years to its head and this improvement is still going on, and I think with the promise of considerable effect. It has a second

head affording it some help in low freshes, and I think it very desirable that a third should be opened from the Cauvery either opposite Coiladdy to fall into the river immediately below the Cutchamungalum Annicut, or about 3 miles from the head immediately below the grand Annicut.

One or other of these projects both of which have been fully investigated should I think be taken into consideration, if it is found that the improved form of the head of the river does not fully answer the purpose of giving it a due share of the whole supply of water.

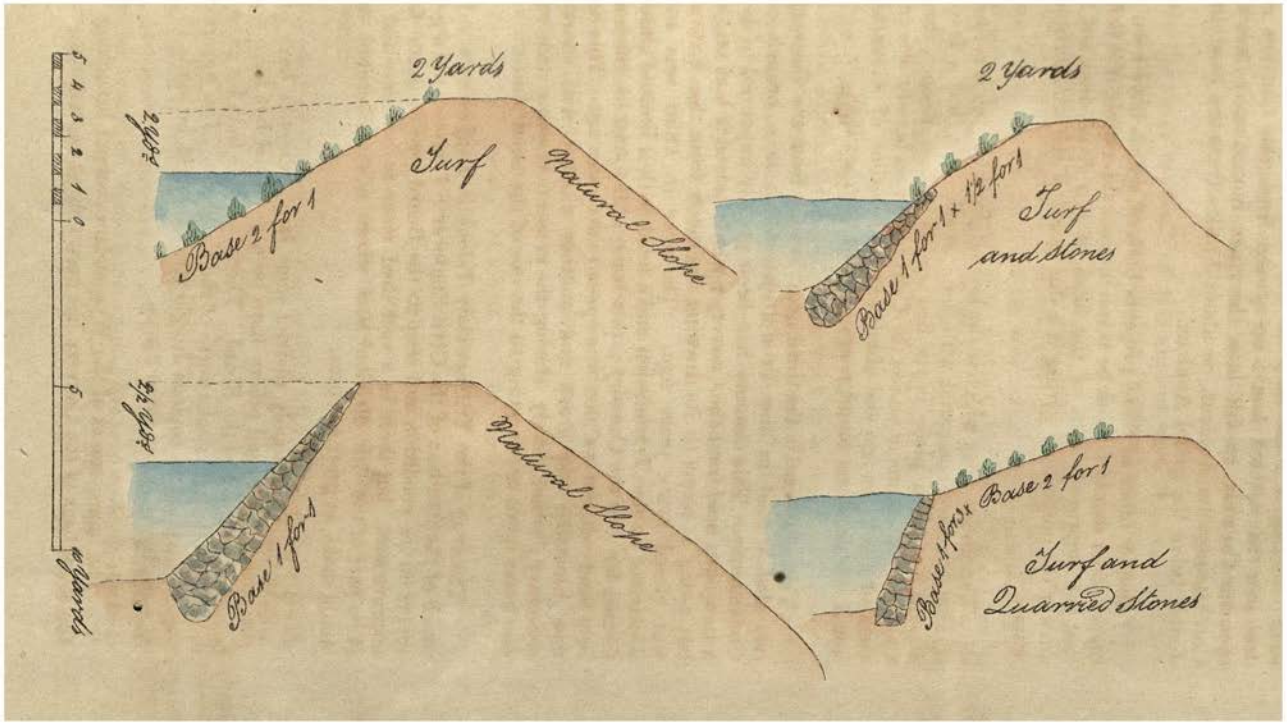
The Codamoorty which is the second great branch was formerly ill supplied also, compared with the parent river, but a favorable change has taken place in its bed and it is now deeper than the Cauvery. An Annicut across the Cauvery for its benefit was recommended four years ago and obtained the sanction of Government, but it has not been found necessary to construct it.

The Arasalaur is the third great branch from the Cauvery. It has also a head in the Trimulrojen which is a branch of the Codamoorty. This channel has been greatly improved of late by a new open head from the Cauvery; which indeed it had originally, but owing it seems to its drawing too much from the Cauvery it was closed many years ago. The river in 1836 was entirely dependent on the Trimulrojen and a head with a limited sluice was formed for it in the Cauvery; this being still found insufficient the new head without a sluice was opened two years ago. This head is now becoming too great and another change will shortly be necessary; either merely closing the present opening and cutting one lower down or reverting to the use of the head sluice.

The state of the Tritrapoondy Talook in Tanjore now calls for much of the attention of the Civil Engineer; I have made a general report on its condition and sent to the Board two projects for its improvement, but there is a vast deal more to be done and there is no part of the 5th division now where a considerable outlay would make so great a return.

In the Trichinopoly district some improvements have of late years taken place and others have been projected but have not received the support of the Board. There is a wide field for extending cultivation in the Talooks north of the Colleroon. The waters of the Vellaur and several copious Jungle streams might be made to yield revenue by irrigating these tracts.

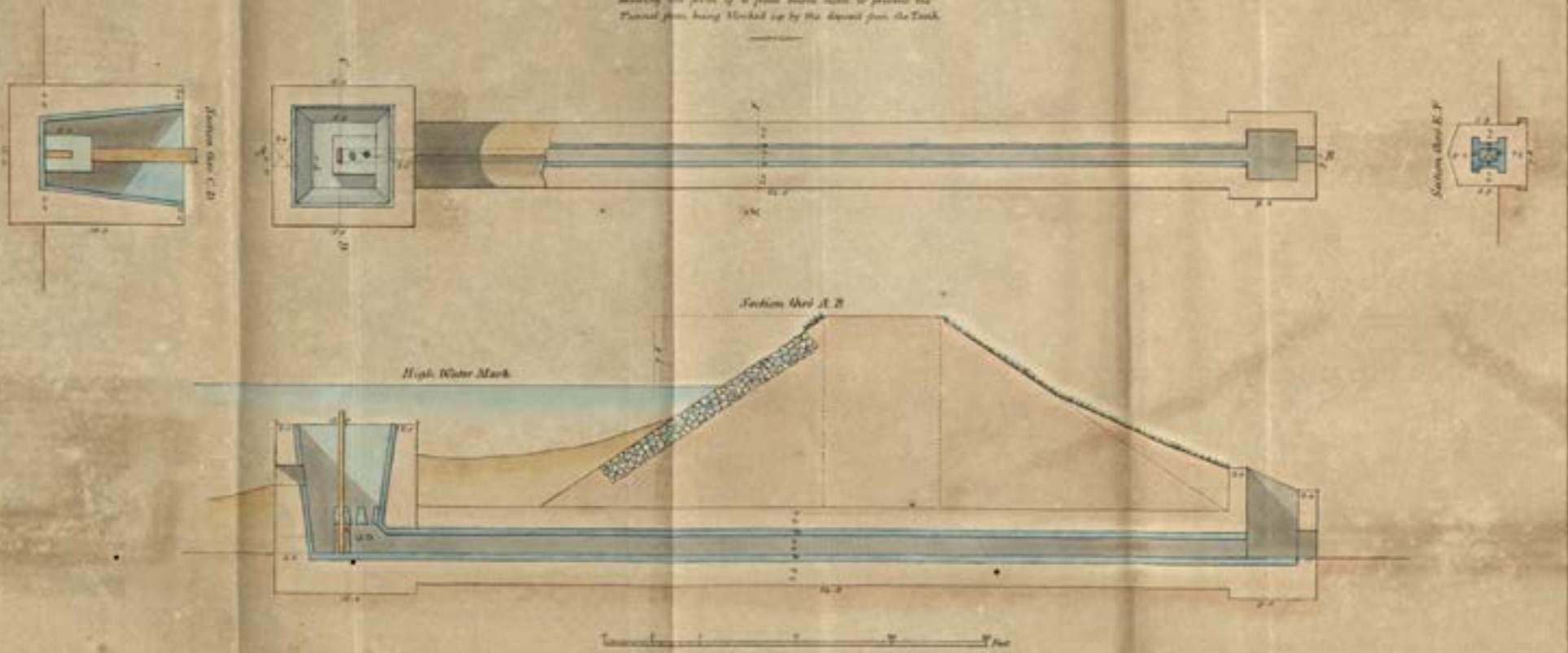
The improvement of the Wyacondam channel branching from the south bank of the Cauvery has been long in contemplation, but


2 Yards
2 Yards
Turf
Natural Slope
Base 2 for 1
Base 1 for 1 x 1½ for 1
Turf
and Stones
Natural Slope
Base 1 for 1
Base 1 for 1 x Base 2 for 1
Turf and
Quarried Stones

# PLAN of a SLUICE or IRRIGATION

## in a Tank of the first Class

*shewing the form of a stone basin built to preserve the Pointed form, being Worked up by the deposit from the Tank*



with many other equally important subjects is deferred until the Civil Engineer's time is available for it, or till he has the assistance of other officers.

In the Talooks of Manargoody and Chellumbrum in south Arcot very extensive improvement has been made. Channels have been laid out over a great tract of waste land, and the Vuddavaur which is the main channel has been widened and the whole being supplied by means of the lower Colleroon Annicut they never fail; a great deal also has been done for the distribution of the water to the old cultivation and with these improvements in the irrigation, a system has been planned and to some extent carried out of the drainage of the Talooks, so that the whole state of the cultivation is in a condition to advance rapidly, but it is unhappily checked by the low prices of grains, the consequent poverty of the people and the want of some considerable change in the laws affecting the tenure of the land and encouragement to those who are willing to cultivate.

A line of navigation has been established from the Cauvery across the Colleroon and through Manargoody and Chellumbrum to Porto Novo. This most valuable project obtained the sanction of the Supreme Government almost two years ago and it is now nearly completed. The traffic from Coimbatore and Salem formerly went down the Colleroon direct to the sea, but since the construction of the Colleroon Annicuts that river is seldom navigable for more than two or three days at a time and usually only at one period in the month of July; when the freshes are at the greatest height. To remedy this serious loss to the mercantile community this new line has been established. Its course is down the Cauvery and uniting with the Trichinopoly trade, it follows the course of that river to Permaul Coil about 40 miles below Trichinopoly where a lock of 9 feet fall with a regulating basin for the highest rise of the river, has been constructed for the descent into the Munnyaur, an irrigating stream branching from the Colleroon. The navigation then takes the course of this stream to Tripendaul a distance of 25 miles where a level canal two miles in length communicates with the Colleroon immediately above the lower Annicut. This canal has a regulating lock at the upper end and a lock of 9 feet fall into the Colleroon at the other extremity. Crossing the Colleroon into the Vuddavaur and pursuing the course of that channel to the great Veeranum tank at Laulpett another descent is met with which is obtained by a lock allowing for 7 feet fall besides the varying height of water in the tank. From this a short canal of half a mile with a lock to two falls of 7 feet at its lower extremity gives a descent into the Vellicul; a deep surplus channel falling into Cawn Saib's channel at the distance of 3 miles below Laulpets; after which there is no lock till the month of the Vellaur is reached where a lock of 6 feet fall provides for the descent to the level of the sea. The Cauvery is navigable from Trichinopoly to Permaul

Coil with some intermissions from June till December and the remainder of the line remains open sometimes till February. The streams are moderate in velocity and far down traffic exceedingly easy and convenient. The locks are built for barges 48 feet in length by 12 in breadth and drawing 4 feet of water or 4 basket boats of 12 feet diameter. It would be difficult and expensive to make good towing paths on this line and in the Cauvery it is of course impracticable, it would therefore be exceedingly desirable to use steam for ascending and if this were introduced I have no doubt the line would be crowded up and down with merchandize and Government stores, troops and passengers of all descriptions: barges should be built to fit the locks and steam tug vessels of moderate power to take them up from the coast to Trichonopoly. The long talked of coast canal, or sea going steamers would complete the line from the Presidency.

Many bridges have been built in Tanjore within the last six years, the most important of which are the Vettaur bridge at Nagore 12 arches of 30 feet span, and the Vennaur at Tanjore 5 arches of 58 feet each and besides these about 20 bridges of from 30 feet to 150 feet water-way. These with many smaller tunnels complete several most useful lines of road through a country hitherto locked up during about 8 months in the year from any possible communication through it, except in one or two main lines of road. It has always been my study, if possible, so to construct irrigation works as that they may afford communication over the streams on which they are built and this has tended also to open roads and render accessible towns and villages to which there had previously been no approach during the cultivating season.

I have also endeavoured to make the river and minor channel embankments passable roads, not only for the convenience of the public but that they may be well examined and kept in order. I have no doubt that attention to these points has been of great general benefit to the country, not merely at no expense to the Government, but preventing many accidents and thereby saving much in the repair of breaches. The bridges have been always designed on the most economical principles consistent with stability. I have studiously avoided all ornament and adopted arches seldom exceeding 30 feet span which are easily managed and are done with almost the least comparative quantity of masonry. The whole population of the district is alive to the benefit they have derived from these communications and I am sure I utter the unanimous voice of the whole district when I say that stopping the expenditure of the surplus Davastanum funds in this way has been a severe disappointment, and that if put to the vote every hand would be held up for the disposal of these funds in the construction of bridges and other works for the public good. The funds do not belong to Government, and the Government desires not to appropriate them

to State purposes; they belong to no individuals or particular communities, and few if any individuals are found willing to take upon themselves the charge of them with the Pagodas; they belong to the people and the people are willing and anxious that they should be laid out in this way and undoubtedly the indirect benefit which the State would obtain from the improved communications, would be great, while the energies of the people would be diverted from their extravagant ceremonies, to the promotion of works of usefulness. The proposed bridge over the Cauvery at Trichinopoly is one of the most desirable works in this part of the country. It was planned and estimated six years ago, and was approved and sanctioned by the Court of Directors but has never been built. The Pagoda funds might well be employed in this work, and whether the welfare of the people, the wish of the East India Company, the interest of the State, the whims, fancies, or rational desires of every caste and class of the people are consulted, they must be so disposed of; one and all of these will most assuredly agree that they can be applied to no more satisfactory purpose. I have carefully planned the bridge, marked out what I consider the best site for it, and I trust the work will yet be undertaken.

(True Copies)

J. H. BELL,

*Secy. to the Board of Revenue, D. P. W.*

*Upper Colleroon Annicut,*
10*th March* 1842.

No. 191, B.

*Extract from the proceedings of the Board of Revenue, in the Department of Public Works under date the* 25*th April* 1842.

In obedience to the orders of Government contained in the Minutes of Consultation, dated 17th March 1842, the Board proceed to take into consideration the correspondence which accompanied it.

The subject, on which the Military Board of the Bengal Presidency request information may be said to embrace the whole science of irrigation as practised in the Madras Territories, while the reports called for can hardly be supplied without not only a careful examination and selection of the masses of papers and plans that exist in the records of the department of public works at the Presidency and of the eight Civil Engineers, but the preparation of new plans and the taking of new series of levels and surveys in order to supply materials capable of being put together in a compact form and which might serve as a basis for the guidance of persons unac-

quainted with the nature of the works it is now proposed to imitate in the Bengal Provinces.

There can be no doubt that such a digest would be generally useful, but it would be a work of some labour and time, and, unwilling to delay replying to the orders of Government until it shall be completed, the Board instruct their Secretary to select such plans and reports as appear likely to afford most of the desired information, and at the same time to submit in a few paragraphs a general explanation of the nature of the artificial means in use in the Madras Presidency for the purpose of securing water during the dry season to sustain the irrigation of rice lands.

(A true Extract)

(Signed) S. BEST,
*Actg. Secy. to the Board of Revenue, D. P. W.*

No. 442.

FROM CAPTAIN S. BEST,
*Secy. to the Board of Revenue, D. P. W.*

To R. CLERK, ESQUIRE,
*Acting Chief Secy. to Govt.*

SIR,

Para. 1. I am directed by the Board of Revenue to acknowledge the receipt of the extract from the Minutes of Consultation, dated the 17th of last March, transmitting an application from the Bengal Military Board for information respecting the system of irrigation pursued under this Presidency.

2. With the view of supplying the required information, the accompanying memorandum has been prepared, which with the plans and notes intended to illustrate the subject, will, it is hoped, prove of some service to the Bengal Authorities in any projects which they may propose to undertake to extend and improve the agriculture of that Presidency.

1 Memo.

3. The Revenue Board is aware that the report is incomplete, and that it may not be found to convey satisfactory information on all the topics embraced in the letter from the Bengal Board, and indeed it is impossible without much and direct communication to make so comprehensive and intricate a subject as the system of irrigation at this Presidency intelligible to those who have not had an opportunity of witnessing and examining it. More

# PROPOSED RESERVOIR
for
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details and plans will however be supplied as they can be collected and digested, and the Board will always be ready to explain more fully any parts of the system which are not clearly comprehended. They will also be happy to give their best consideration to any special plans or projects for the establishment of works of irrigation, on which the Bengal Authorities may wish for their opinion, and it is possible that the interests of both Presidencies may be advanced by a free interchange of opinions and experience.

4. To save unnecessary trouble to both Governments, it may be convenient to place the Bengal Military Board in direct communication with the Revenue and Military Boards at this presidency on questions connected with irrigation.

5. I am directed to take this opportunity of stating that the information applied for by the Bombay Government is now under preparation, and will be afforded at an early period.

I have the honor to be, &c.

(Signed) S. BEST,

*Secy. to the Board of Rev. D. P. W.*

*Department of Public Works,*
*Madras, 8th September* 1842.

# MEMORANDUM

## ON THE SYSTEM OF IRRIGATION IN THE MADRAS PRESIDENCY.

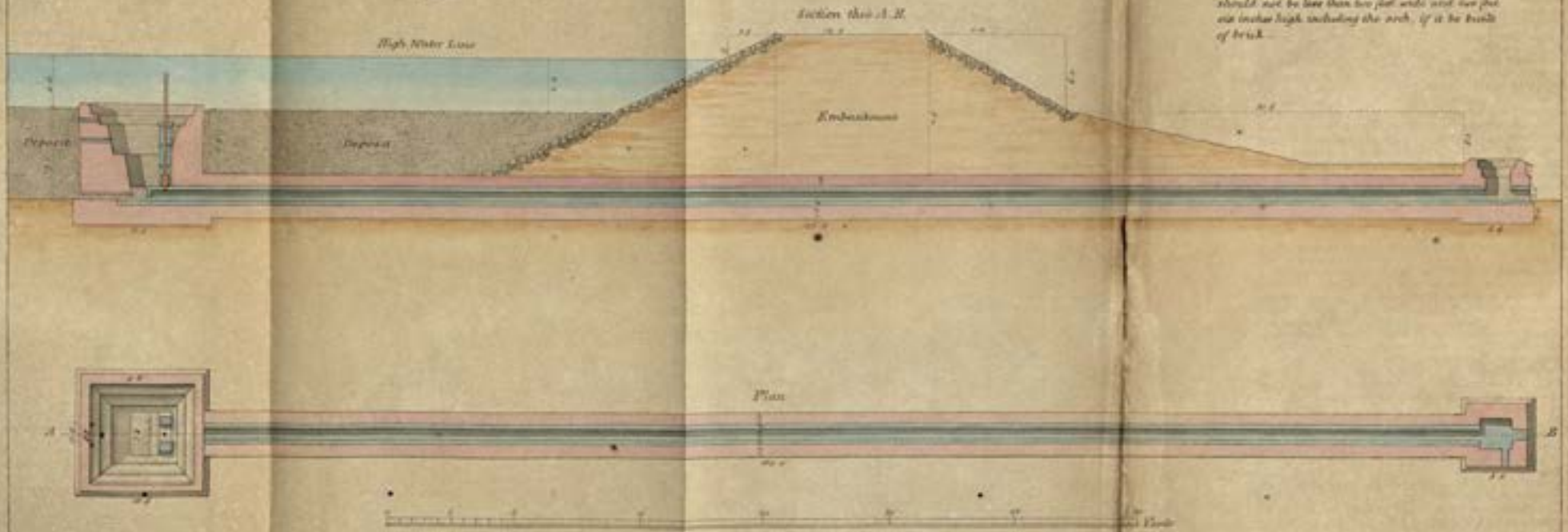
1. The simplest and most usual description of work is the TANK. This is formed by raising across the upper part of a valley an embankment, by means of which water supplied by the periodical rains, by jungle streams, or by river channels, is collected and retained for irrigating the lands and bringing the crops to maturity during the hot months. The fields occupying the lower part of the valley are watered from the tank through sluices of irrigation erected in its bank.

2. The banks of the generality of tanks seldom exceed 5 yards in height. Many of them are formed of earth only, in a few instances carefully turfed; while some of the larger works, and in country where stone is abundant, many of the smaller banks also, are protected by loose blocks of rough stone laid on the inner sloping surface or disposed in the form of a nearly upright revetment without mortar or cement. The object of these rough stone facings is not so much to support the earth work as to protect it from the action of the waves during stormy weather and from damage by the monsoon rains. [*Vide plans*]. Many tanks are often formed in the same valley, the bed of one sometimes beginning where the cultivation under that above it ceases. In consequence of this the breaching of one tank often leads by the sudden influx of its waters to the bursting in succession of those below it. This is more particularly the case when heavy and sudden rains succeed seasons of drought, during which the earth of which the tank banks are composed loses tenacity and is soon saturated by water. Another and the general cause of the breaching of tanks is the neglected state of their banks which are not in all parts sufficiently raised above the surface of the water in them. High winds exciting waves in the tank, throw the spray over the lowest parts of the banks which are thus gradually worn away until at last the water overtops them and a breach ensues.

3. In order to provide for the out-flow of such water as may enter the tank after it has received as much as the state of its banks enables it safely to hold, portions of the bank (generally at one or both extremities and frequently across the bed of the jungle stream by which the water arrives) are formed of masonry, the height of which is so regulated as to allow the surplus water to pass over, and their lengths which vary from 5 to 200 and 300 yards, by the size of the tanks and the quantity of water which they receive during floods and the monsoon rains. Works of this nature are generally known in this Presidency by the name CALINGULAH, a Tamil word of originally much wider import. Along the upper surface of these, a row of upright stones 2 to 4 feet apart and from 2 to 8 feet high are generally inserted. The interstices between these stones are filled up with earth, straw and rubbish to increase the capacity of the tank when the rains are moderate, but when the supply of water is too great, and the tank is in danger of being breached, the interstices are cleared to allow a large quantity of water to escape, the rapidity of the out-flow being increased by the additional vent thus afforded. The dam stones are made of such height that the top of the temporary bank raised between them is nearly on the level to which water can rise in the tank without endangering its bank. In some tanks, the excess of water flows out from vents pierced at a low level in masonry walls similarly placed. These vents are closed by vertical planks inserted side by side or by shutters. Works of this description termed SURPLUS SLUICES

# PLAN AND SECTION OF THE MAIN SLUICE of a Tank in the BELLARY DISTRICT

Note. The method of closing and opening the orifice of tank, please is shown in this drawing. The interior basin has been built to prevent the mud from blocking up the tunnel. It is always desirable that the tunnel should be of sufficient dimensions to admit of a boy, when it is necessary to clear it of mud. It should not be less than two feet wide and two feet six inches high including the arch, if it be built of brick.



allowing the water to flow out with greater rapidity are of smaller dimensions and less expensive than Calingulahs. They have also the very great advantage of permitting the escape of mud and sand from the bed of the tank, by the accumulation of which all such works are otherwise liable, in the course of time, to be filled up and rendered useless. Vents to be closed by planks or shutters have frequently been constructed in the lower part of the body of Calingulahs. But the common Calingulah is the usual way of allowing the surplus water of tanks to escape.

4. Sluices of irrigation consist of long tunnels of cemented brick or stone, arched or covered with flat stones, passing through the banks of tanks and on a level with the bed of the tank—furnished at the extremity inside the tank with a contrivance for regulating the quantity of water that flows to the fields and at the other end with a cistern or basin, the walls of which are pierced with holes at different levels through which water running to the branch channels is carried to fields at various elevations. The sluices in large tanks have sometimes cisterns at the inner end also, the object of which is to prevent the accumulation of mud at the head of the sluice. The ordinary contrivance at the head of the sluices known by the name of payal, consists in a vertical door (often merely a block of stone) which is removed to allow water to flow, only when the tank is nearly empty, and in a portion of the covering (which is of stone) being pierced with a conical hole in which a conical block of wood attached to a long bamboo is moved upwards or downwards from a frame of two large upright stones and two or three placed transversely for the sluice man to stand on. These latter have holes in them through which the bamboo is lifted or lowered. The orifice through which the water issues is blocked by this description of stopple or opened to any desirable extent according to the demand for water.

5. Irrigation by tanks is often combined with that by rivers, the water from the rivers being brought into tanks that are favourably situated by means of channels cut through the river bank and intervening ground.

6. Irrigation from rivers requires far more scientific knowledge and enquiry than irrigation by means of tanks only, such as is above described. It is easy to judge of the possibility of retaining water by stopping the course of the natural drainage or of jungle streams of moderate dimensions, but to decide on the possibility of partially diverting the waters of rivers into entirely new courses, and on the positions that these new courses should occupy, so as with the least expense of excavation to obtain the greatest and most constant supply of water, requires not only a just appreciation of the difficulties of digging in soils of varying hardness and to varying depths, but the taking of accurate sections on different lines, by which to ascertain the relative levels and the fall that can be allowed to the

beds of the proposed CHANNELS, in short a knowledge of the form of the ground both accurate and comprehensive.

7. A plain which it is desirable to irrigate can hardly be so situated but that the bed of a neighbouring river is at some part or other of its course relatively higher in level. Supposing* a surface A. B. to slope from A. to B. at the rate of 2 feet in a mile and to be traversed by a river C. D. the bed of which falls at the same rate but is throughout 20 feet below its banks, it is evident that the part of the slope which is 10 miles from A. towards B. will be on the same level as C. and that were a channel C. E. excavated with a horizontal bed, water from the river above C. would flow along it until it reached E. whence it might be conducted to irrigate the lower portions of the slope E. B.

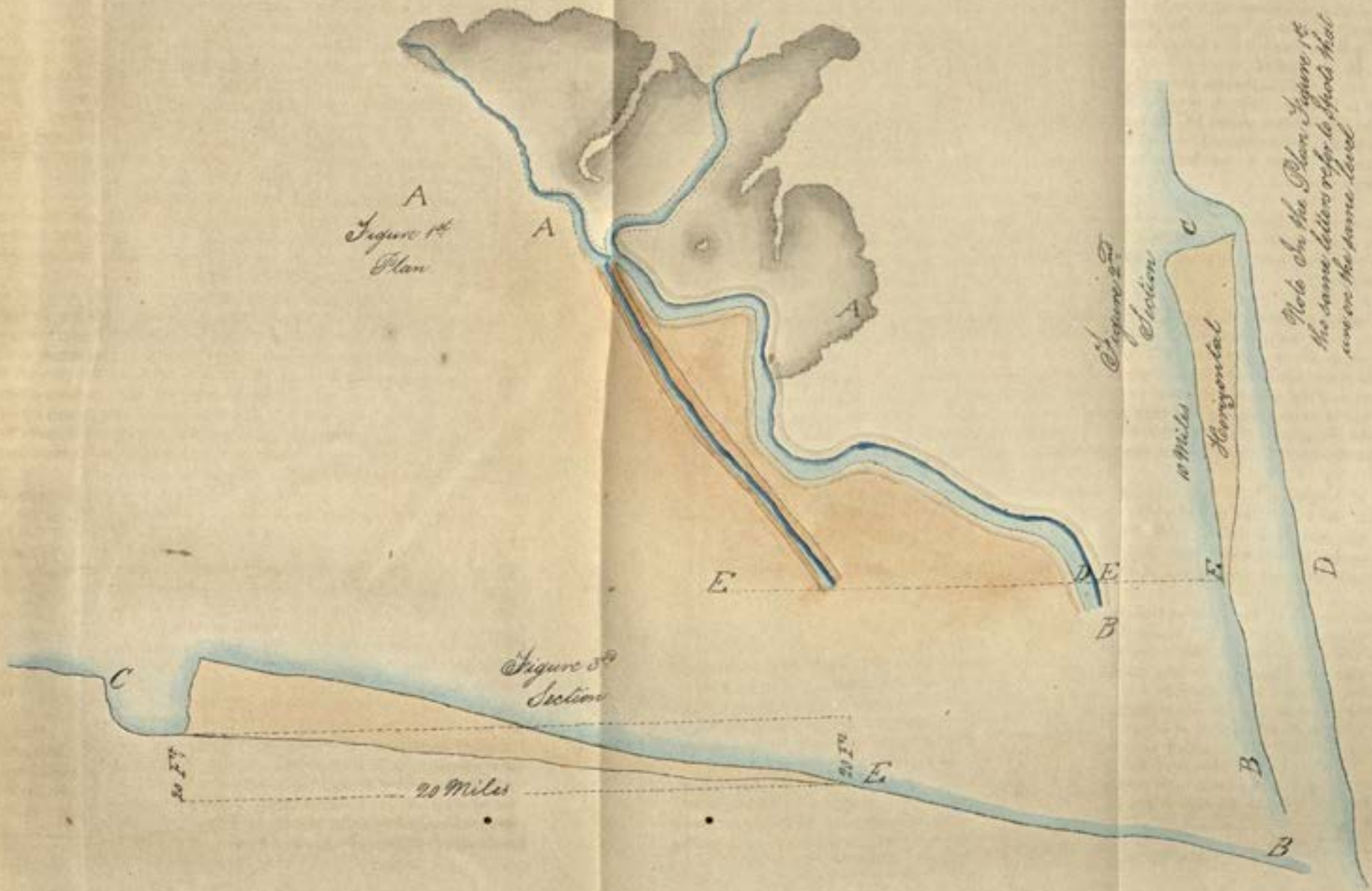
8. In like manner, if the bed of the channel were made to fall one foot per mile, it would at 10 miles be only 10 feet below the country; and at 20 miles, having gained a foot per mile, it would emerge on its surface.

9. The case is more unfavourable but still similar though the country should also slope, as it most frequently does, towards the river as well as towards the sea. In this case the water to the lands farthest from the river must be brought from a part of the bed nearer to its sources and the excavations must be deeper or, as it will often happen the expense bearing too high a ratio to the attainable advantage, the irrigation must be restricted to those lands which lie nearest to the course of the river and at the lowest levels.

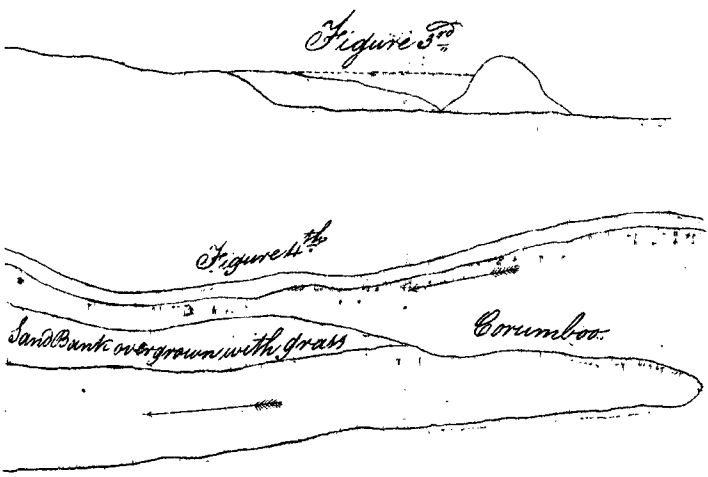
10. CHANNELS of irrigation have been taken off rivers such as the Palaur in Arcot, the fall of the bed of which is at the rate of nearly 10 feet in a mile and its ill defined banks 6 to 8 feet high, as well as from such as the Kistna which runs with a fall of less than one foot per mile and between steep banks of 35 feet.

11. It is the relative fall of the river and of the country on its banks which determines the least length which the channel can have in order that its bed should emerge above the surface and its water be brought to use, but when the freshes are of short duration and channels are led to tanks, it is evidently desirable, in order that they should deliver water rapidly that they should be wide and the velocity of water in them considerable; although to afford slope to their beds their length should be extended and the expense of excavation increased. Six or eight yards may be considered the greatest depth to which irrigating channels have yet been excavated in this Presidency; but the general average is not more than two

* Fig. 1. 2.


A
A
Figure 1st
Plan
A
Figure 2d
Section
C
Horizontal
10 Miles
E
D
E
B
Figure 3d
Section
C
20 Ft.
20 Miles
20 Ft.
E
B
B
Note As the Plan Figure 1st
has some Letters refer to Figure 3d
and the same Letters

or three yards. Great portions of some channels have been formed by throwing up one bank only on the lower side of a slope ; thus, (Fig. 3.)




And the heads of some river channels by separating part of the bed of the main stream by means of an artificial bank, (Fig. 4.) protected by river grasses, &c.

12. In some cases, these artificial banks are carried for very considerable distances up the rivers or obliquely across their sandy beds.

13. Such banks termed CORUMBOO are generally over-topped and carried away by all freshes of more than $1\frac{1}{2}$ yard depth of water. They are temporary expedients or substitutes for permanent dams or Annicuts, to turn the early and low freshes of rivers into irrigating or tank channels, and being liable to be partially and sometimes entirely destroyed by every full fresh, require to be repeatedly

repaired and occasionally re-constructed during every season. They are usually constructed and kept in repair by the proprietors of the land which they irrigate without any cost to Government.

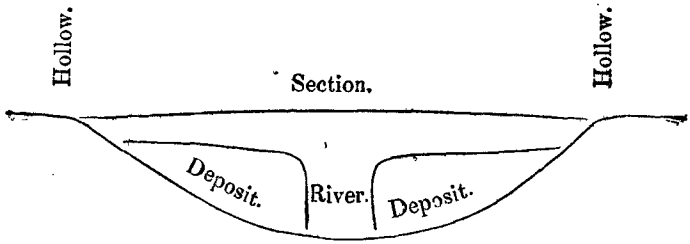
14. In the Kistna and Godavery banks, the channels not having been excavated to more than 15 feet depth* no water enters them until those rivers are partially filled and the lands do not receive water from them excepting during the season of freshes or for about 4 months of the year.

* The bed of the river being 30 feet below the banks.

15. In such cases when the bed of the channel at the head is not made as deep as that of the river, it may as well be horizontal, for to obtain some water during a longer period by having the head of a channel deep is more desirable than to sacrifice this advantage for the purpose of obtaining increased velocity by giving slope to the bed, in fact, the velocity depends not upon the slope of the bed but upon that of the surface, and these are rarely the same in channels such as those of irrigation which are seldom or never uniform in depth or dimensions, in direction or in any other respects. The interior of the Masulipatam district south east of a line drawn from Bezwara through Ellore and Rajamundry is in great part lower in level than the beds of the rivers at the points crossed by the same line, and might be irrigated from these rivers even when their waters are lowest, if channels were cut of sufficient depth through the ground which slopes from their borders. The slope begins with a fall of 4 feet a mile, but is gradually reduced in approaching the Colair Lake, a shallow basin that occupies the centre of plains almost flat and from 6 to 12 feet only above low water in the neighbouring sea.

16. The extreme depth of such channels would be for the Kistna 35 feet and for the Godavery 25 feet; but it must be noticed that the channels now in existence (and the depth of which, below the country at their heads, nowhere exceeds 15 feet) are liable to be partly blocked by deposits of sand which require to be annually removed. The velocity of these rivers being at the freshes about 5 miles per hour, even their *upper* water is then mixed with large quantities of earth and sand, which, being brought into the channels with the water are deposited chiefly in their beds as the velocity gradually decreases. It seems probable that the country traversed by the Mahanuddy to which the Bengal Military Board particularly allude, would also if examined prove to fall from the banks of that river and to be susceptible of irrigation in the same way as the combined Kistna and Godavery Delta. This conformation may indeed be predicted of all country inundated by the over-flow of rivers, the sediment of which is deposited in greatest quantity near

their banks; raising the neighbouring ground and gradually forming a slope in reverse of that which first determined the course of the stream.




On both banks of the Kistna and on the west bank of the Godavery the meeting of these two slopes is occupied by the drainage of the great inundations and has been made use of to serve as channels for irrigation also, but, as it is necessarily low in level relatively to the ground to be irrigated, this arrangement, adopted by the natives probably to save immediate expense, and to secure the flow of water, is not recommended for imitation.

17. Most of the works in the Madras Presidency are old native works such as have been kept in repairs and in use, or such as have been restored or modified by the officers of the British Government. The positions adapted to the formation of tanks have for the most part been already occupied and very few of the rivers or even mountain streams have been allowed to reach the sea without having been forced to contribute some of their water to channels and reservoirs. There are very few complete systems of works which owe their existence to our Government, although there are, on the other hand, but few works which have not undergone alteration, repairs and improvement since the countries came into British possession and the attention of scientific officers was directed to them.

18. In consequence, among a vast variety and number of works there are few or none that could be held up as models for close imitation while the irregularities in the slopes and widths of channels, the crookedness of their courses, said in some instances to have been determined by astrological considerations, generally turned to avoid difficulties by no means insuperable to our more efficient means, and always subjected to the caprice and the interests of petty proprietors unbalanced while under the old unsettled Governments, have prevented the obtaining of such useful data as might have been derived from observations made on works constructed more according to principles of art.

19. The Bengal Military Board seem to have been much misinformed on the subject of ANNICUTS.

20. The word "Annicut" is Tamil and means generally dam or weir. It is a pity that in English writing, English words, the signification of which is more *exactly* limited, should not have been used in preference. Our engineers have with one exception (the Grand Annicut at the end of Seringham Island, which is a waste weir or diversoir) restricted the use of the term to a dam across a stream, and that of the word "Calingulah" to a work of similar form in the bank either of a supplying stream or of a tank. No such distinction is made by *those* natives, who have not been taught to make it by Europeans.

21. The chief object of Annicuts is to raise the water of the streams they are built across, in order that a portion of it should be diverted into channels leading, as the case may be, directly to the fields or to tanks, in which the water is stored up to be used as required. Some Annicuts are like Calingulahs furnished with dam stones to sustain temporary banks of mud, &c. and to raise the water in the river beds during the dry season and the early and low freshes; such temporary embankments being washed away by the freshes, others are provided with sluices or have low parts or gaps left in them seldom exceeding five feet each; within which limit, it is not difficult to provide means of closing, such as shutters, &c. By these, the sand is more or less prevented from accumulating to the height of the crown of the dam and parts of the beds of the rivers, generally inconsiderable however, are thus formed into pools extending towards their sources.

22. These are in no instance looked upon, as the Bengal Military Board imagine, in the light of tanks. They may, for a trifling period at the very end of the dry season, answer the same purpose, but the irrigation depends in all cases either upon the continual flow of a small quantity of water during the early part of the hot season, or upon tanks generally far away from the river and which are supplied by channels during the freshes.

23. Almost all the rivers in the Carnatic, are little more than beds of dry sand during the hot season, and very little water can then be procured from them for the purposes of irrigation. During the Monsoons they are more or less full, and it is then only, or at least chiefly, that a portion of their waters is diverted by means of Annicuts and channels into the adjoining country, to fertilize and moisten the rice and garden lands. During the periodical rains there is generally too much water, and in the hot months none, and the object of all the expedients and works of irrigation is to rectify these evils, by collecting and retaining in tanks or reservoirs a portion of the surplus water of the Monsoons for the irrigation of the country during the dry season.

24. When the slope of the country is gradual, it is evident that a dam across a river may, by raising the water in its bed, very much diminish the length of an irrigating channel to be led off it, and it might appear that Annicuts would on this account be found generally in the lower parts of the courses of rivers where the fall is gradual. But this is not the case, because the lower parts of rivers are generally wider, their beds sandy and unfavourable to such buildings, and their banks low. The obstruction of the bed in such localities would raise the surface of the water in freshes and render necessary the formation of banks to prevent the inundation of the country through which the river passes: for, however advantageous such inundations are in the Deltas of the Ganges and Godavery, they are most carefully guarded against on the banks of the Cauvery and Tambrapoorny where the crops are raised not by *inundation* but by a very artificial and (as far as the science of agriculture is concerned) a very perfect system of *irrigation.*

25. Annicuts are most generally useful nearer to the sources of streams where they traverse rocky country. In such situations, rocky foundations can generally be obtained, and the work built securely; while, although the fall of country is great and channels do not need to be very long, yet without Annicuts, the difficulty arising from the nature of soil, in such parts generally stony and which it would be necessary to excavate to a great depth, would be very often absolutely insuperable.

26. A rocky bed though a great advantage, and always to be preferred in selecting a site for an Annicut as contributing to reduce the cost and increase the stability of the work is not however an indispensable requisite. Several Annicuts have recently been built with perfect success and at a moderate expense across rivers, the beds of which consist entirely of pure sand to a depth far beyond the foundations of these works. On such occasions, the chief point to be studied is the formation of a strong and substantial apron beneath the Annicut to break the overfall of the water, and prevent the foundations being undermined. The manner of doing this will be understood from an examination of the plans and Sections of the Coleroon Annicuts.

27. Generally in the wide and flat beds of rivers near their mouths the scanty supply of water during the dry season is collected and turned into channels by means of the temporary embankments of grass, baskets, sticks and sand which have already been mentioned by the name *Corumboo;* but there are two modern Annicuts in such situations, mention of which must not be neglected even in a notice so cursory as this is.

28. These are the Upper and Lower Annicuts across the Coleroon, built at the suggestion and under the superintendence of Captain Arthur Cotton of the Madras Engineers. Both these

works have superseded and rendered unnecessary the construction of extensive Corumboos; while unlike Corumboos, they resist the action of freshes and assist the irrigation in all states of the river. The Upper Annicut is built where the (Agunda or whole) Cauvery divides into two branches, the Coleroon which seeks the sea by a straight course falling at the rate of about 2 feet per mile, the smaller but more useful branch (which retains the name of Cauvery) flowing on a more elevated bed, and, after having in the short distance of 40 miles gained no less than 15 feet on the level of the bed of the main branch, dividing and sub-dividing until its ramifications spread over the greater part of the Tanjore district, in irrigating which almost all its water is gradually exhausted. For many years previous to 1836, the Tanjore cultivation had pressed so closely upon the supply of water afforded by the Cauvery that in seasons falling at all below the average, extensive tracts of valuable land either remained uncultivated or were subject to the still greater evil of being cultivated in vain. The defect was chiefly attributed to the accumulation of sand in the upper part of the stream near its separation from the Coleroon, to remove which various expedients were devised and adopted with partial but only temporary success and inadequate to the necessities of the case. At this conjuncture, viz. in 1836, Captain Cotton, then Civil Engineer of the division, devised the Annicut which is built across the Coleroon about 100 yards below the separation of the two rivers and by raising the bed of the Coleroon about 6 feet has, without diminishing except in a trifling degree the capacity of its section for the passage of high freshes, rendered available for the supply of the Cauvery and of Tanjore all the water which even in the driest season and when most wanted for irrigation, used to pass waste to the sea. The lower Annicut was built in the same year about 70 miles down the same river and serves to turn the water that accumulates in the intervening part of the river bed from the drainage of cultivation and the springs that ooze from the sand into the country on both sides and irrigates extensive and fertile tracts of land in the Tanjore and south Arcot Districts between the Annicut and the sea.

29. These two works are very similar in form, consisting of walls of brick in chunam, the surface only being covered with cut-stone, the foundations of which rest on rows of brick wells sunk in the sand and filled with rubbish, and are protected by an apron of stone work, on the paved surface of which the water falls and its tendency to undermine is in great measure broken and destroyed. Several sluices or vents of 3 to 6 feet by 3 to 6 feet have been left in the body of the work for the purpose of allowing the water to flow through in high freshes and carry sand with it, but the capacity of these is not sufficient to exercise a decided influence on the bed of the river, and it has in consequence notwithstanding these contrivances been generally much raised by deposits of earth and

sand in front of the dams. Many of the details of these projects and the principles on which they are built will be found in the two reports printed at pages 63 and 131 of the professional papers of the Madras Engineers, and it is not necessary to repeat them here.

30. Details of other works and much of the information applied for in the fifth para. of the letter of the Bengal Military Board may be gathered from the accompanying [*V. Appendix*] plans and reports selected from among the records in this department. These speak for themselves, but it may be important to remark that to ensure the stability of masonry works through or over which water flows, too great care cannot be taken in regard to their foundations.

31. In most of the accompanying drawings will be perceptible the anxiety with which the fall or rush of water has been, by those who designed the works, as far as possible, removed from the body of the works; but some of them will perhaps suggest a doubt whether the expense of labour and materials bestowed in adding external defences might not have been better applied in making the foundations of the work themselves wide and deep enough to have been secure without the appendages of apron below apron, retaining walls, &c. &c.

32. The most perfect specimen of river and channel irrigation under this Presidency, is, that of the Delta formed by the Coleroon and Cauvery rivers in the provinces of Tanjore. A large portion of the waters of the two rivers, is consumed in irrigation, and the numerous channels with their ramifications spreading over the country and throwing off smaller branches as they proceed to irrigate and fertilize the fields, bear a strong resemblance to the veins and arteries of the human body.

33. The system existed in considerable perfection when the province came under the British rule, and is a proof of the attention bestowed on irrigation by the Native Princes, and of the possession by the inhabitants of much experience and practical knowledge of the principles and laws for managing and conducting running water, all that has since been done, has been to improve and extend the same system by the application of European science, and to render more abundant and certain the sources of supply.

34. A sketch of the rivers and channels is now under preparation, which with a memoir on the subject by Major Cotton will

be forwarded for the purpose of being transmitted to the Bengal authorities, as soon as completed.

(Signed) S. BEST,

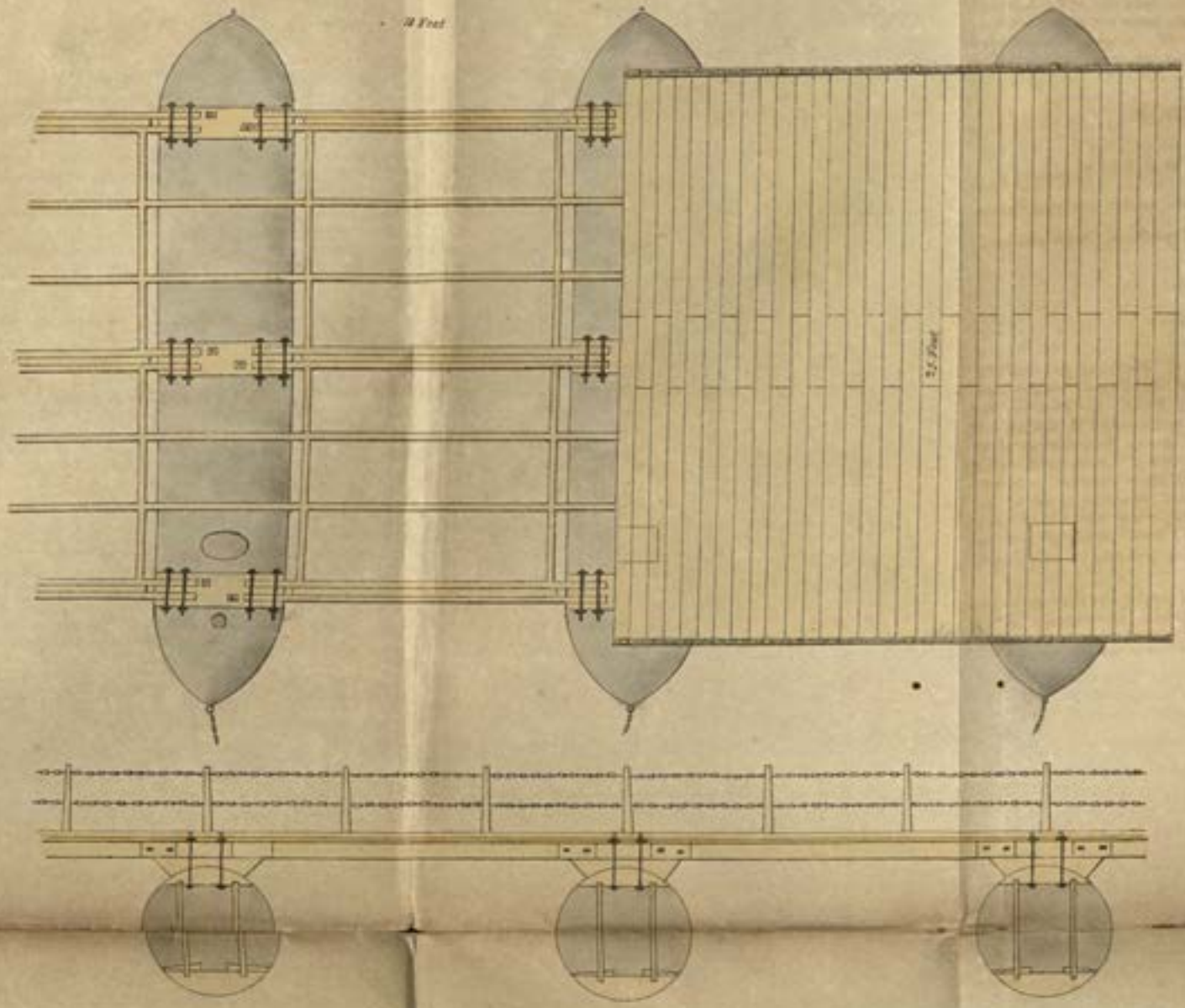
*Secy. to the Board of Revenue, in the D. P. W.*

(True copies)

J. H. BELL,

*Secy. to the Board of Revenue, D. P. W.*

Plan and Section of PONTOONS proposed for a BRIDGE over the JUMNA at AGRA



# No. V.

## PONTOON BRIDGE.

*Remarks by Capt. J. N. Sharpe, Executive Engineer, on a Pontoon Bridge, constructing at Agra, under the superintendence of Mr. C. C. Jackson, the Magistrate, (with Estimate and Plan).*

### SPECIFICATION.

Before detailing the description of Pontoons proposed for this Bridge, I should state that three of them have already been prepared under the superintendence of Mr. C. C. Jackson, the Magistrate of Agra, formed into a raft and inserted in the body of the present bridge of boats, and thus having been submitted to actual trial by passing over them the whole of the captured Seikh Ordnance, may be considered to answer their intended purpose; the specification will therefore be confined to a description of the original design as carried out by the Magistrate, and the estimate framed upon it, with a few observations from myself of any improvements which a consideration of the subject may have suggested.

2. The Pontoons as constructed are cylindrical in shape, with conical ends, the semi-axis being 4 feet; the diameter of the Pontoons is 5 feet 8 inches, the length of the straight portion is 22 feet, making the total length 30 feet. The Pontoon is composed of sheet iron from one-eighth to three-sixteenths of an inch thick. The plates well rivetted and the interior trussed with iron tires or

rings at every sheet of iron. A man-hole is provided, for examining the interior and pumping out water.

3. The centre and two extreme baulks or beams supporting the roadway lie upon saddles bolted to a trussed framing within the Pontoon, as shewn in section, the upper and lower pieces of which are kept in position by two uprights, tightened by wedges. The saddles are composed of 4 pieces of wood firmly bolted together 14 inches in thickness and rising 12 inches above the top of the Pontoon. The baulks or beams which rise in the saddle are composed of two pieces measuring 8 by 22 and one of 3 inches square bolted into the saddle. The intermediate beams, which are 2 by 8 inches are let into cross pieces mortised into the principal beams.

4. The Pontoons are 18 feet from centre to centre, apart; the roadway 25 feet in width composed of 2 inch fir planks nailed down and covered with an inch of earth, kept in its place by side pieces. The roadway to be protected by a railing of light chain, on posts fixed at intervals of 6 feet.

5. As already stated, three Pontoons of the above dimensions have been made and inserted in the body of the Bridge, in which state they draw about 2 feet 10 inches of water, and as it does not seem advisable that the centre of each Pontoon should be depressed more than 6 inches under any load that may be brought upon the Bridge (in which case it would draw 3—10 inches) the load that would depress it down to that level would be about 10,000 lbs. Now the roadway being 25 feet in breadth and the Pontoons 18 feet from centre to centre, this weight would give about 22 lbs. per superficial foot. The greatest load which could be brought upon the bridge would be about 70lbs per superficial foot, and as it may not be possible at all times to prevent a rush or crowd of people upon the bridge, it seems scarcely prudent to trust to so small an amount of floatage per superficial foot. I would beg therefore to suggest that the distance between the Pontoons be reduced to 16 feet and the roadway to 18 feet in breadth, which would give 35 lbs. per superficial foot of floatage.

6. The principal beams of the roadway have been made in three pieces for the sake of economy, but I think that single pieces of 8 by 6 inches would be in every respect preferable, and instead of the weak support given to the intermediate beams I would recommend saddles as for the principal beams; if the central distance between the Pontoons should be reduced to 16 feet, beams would be of sufficient scantling if only $7\frac{1}{2}$ by $4\frac{1}{2}$ and I would make the saddle and trusses only $4\frac{1}{2}$ or 6 inches thick, preserving the bays by

intermediate pieces; this could not add much to the weight of the framing, and when the Pontoons take the ground they would be better able to support, without injury, the load passing over them. The planking which is of fir would, I consider, be better if $2\frac{1}{2}$ inches instead of 2 inches.

7. From the changing state of the river, it is obvious that no determinate part of the bridge can be fixed upon for the passage of the river traffic; it seems therefore desirable that the central intervals of the Pontoons should have some reference to this object, so that the passage may be made in any portion of the bridge. From a measurement of the largest boats in the river it would appear that 26 feet could be a sufficient opening in the bridge; now a raft of 3 Pontoons would at 18 feet interval allow of 30 feet, and at 16 feet would give an opening of 26 feet and whichever may be adopted a passage may be easily effected by making the raft about 4 feet less than the layer opening, and making that portion of the roadway occupying the interval between the raft and the bridge to fall back by hinges.

8. The causeway for approaching the bridge on either side may be similar to that already made on the Agra side of the river, but it should be of sufficient length to be made use of at the highest and lowest levels. The causeway above-mentioned is composed of grooved stone slabs and has a slope of 110 feet, it would therefore require to be 120 feet long, the difference between the highest and lowest level being 12 feet. It would be more convenient to remove the Pontoons floating over the causeway, before they strike the ground, and the small distance to be gained between the first Pontoon and the causeway may be managed by a platform, the beams supporting which should hook on the Pontoon, the other end resting in rollers, the platform will thus of itself change its inclination as the river rises or falls within the limit of floatation of the Pontoon to which it is attached.

9. I have described the means of opening the bridge and approaching it from the shore, because I have not been made acquainted with the Magistrate's views on this subject, and as the means are various, it is probable that he may decide upon a more efficient mode than I have suggested.

The length of Bridge required is about 1242 feet, giving 68 Pontoons at 18 feet apart and 77 at 16 feet.

Digitized with financial assistance from
Shri Brihad Bhartiya Samaj
on 31 October, 2019

## ABSTRACT.

*Estimate of Cost of Pontoon Bridge.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 50 Maunds of Sheet iron, | ... | 371 | 6 | 10 | | | |
| 10 Ditto of Bar iron,... | ... | 200 | 0 | 0 | | | |
| Labor of making up, | ... | 480 | 15 | 2 | | | |
| 450 Square feet of Roadway, | ... | 376 | 3 | 0 | | | |
| | | | | | 1,428 | 9 | 0 |
| Add 5 per cent. Contingencies, | ... | | | ... | 71 | 7 | 0 |
| | | | | | 1,500 | 0 | 0 |
| Add for 67 more, | ... | ... | ... | ... | 1,01,500 | 0 | 0 |
| | | | | | 1,03,000 | 0 | 0 |
| If at intervals of 16 feet add for 9 more, | ... | | | | 13,500 | 0 | 0 |
| Grand Total, Company's Rupees, | ... | | | | 1,16,500 | 0 | 0 |

(Signed) J. N. SHARPE,
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